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(54) **Gaming apparatus**

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(73) Proprietor: **Aruze Corporation**
Tokyo (JP)

(72) Inventor: **Okada, Kazuo**
c/o Aruze Corporation
Tokyo (JP)

(74) Representative: **Grünecker, Kinkeldey,**
Stockmair & Schwanhäusser
Anwaltssozietät
Maximilianstrasse 58
80538 München (DE)

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EP 1 376 495 B1

Description

CROSS REFERENCE TO RELATED APPLICATIONS

[0001] This application is based upon and claims the benefit of priority from the prior Japanese Patent Applications No. P2002-184600, filed on June 25,2002; the entire contents of which are incorporated herein by reference.

BACKGROUND OF THE INVENTION

1. Field of the Invention

[0002] The present invention relates to a gaming apparatus, such as slot machine, pachinko machine or other gaming apparatus, which comprise a variable display means to variebly display symbols required for a game and a controller to control the varying of the display.

2. Description of the Related Art

[0003] Conventionally, as an aforementioned type of gaming apparatus, a slot machine which comprises a stopping means to stop varying of the display, as so-called "pachi-slo" gaming apparatus is known. Fig. 1 shows a conventional pachi-slo gaming apparatus X.

[0004] The pachi-slo gaming apparatus X comprises, three reels 104 to 106, which variably display a plurality of symbols, in display windows 101 to 103 on a face panel 100, and a variable display unit configured with reel stop buttons 107 to 109, to stop the reels 104 to 106. If a prescribed symbol combination lines up on the variable display unit, a return is given to a player of the pachi-slo gaming apparatus X.

[0005] Further, winning lines, which relate to nine (9) symbols formed by three (3) rows X three (3) lines are printed on a front side of the face panel 100. These winning lines are a one medal winning line 111 in the middle, which becomes active if one medal is inserted, two medal winning lines 112a, 112b, which become additionally active if two medals are inserted, and three medal winning lines 113a, 113b, which become additionally active if three medals are inserted. In Fig. 1, the pachi-slo gaming apparatus X also has a game token insertion slot 114 configured to accept a game token (e.g., medal or coin) and a start lever 115 configured to start a game.

[0006] Incidentally, regarding the variable display unit, besides the above mechanical type using the reels 104 to 106, there is also a display unit which can variably display symbols using a liquid crystal display (LCD), etc.

[0007] As for procedure of playing game, a game is started by insertion of a game token into the game token insertion slot 114. The controller then controls the variable display unit to spin the reels 104 to 106 according to an operation of the start lever 115 by the player, and symbols are then variably displayed.

[0008] The variably displayed symbols stop automatically after a certain period of time or stop according to an operation of the reel stop buttons 107 to 109 so as to stop spinning of the reels 104 to 106 one after the other. As a result, if symbols on the reels 104 to 106 appeared within the display windows 101 to 103 reach a certain combination (winning combination), game tokens are paid out so that a return can be given to the player.

[0009] The aforementioned pachi-slo gaming apparatus X has a plurality of winning modes. Specifically, in a case where the player wins a prescribed prize, in addition to a single payout of medals, a game state is transferred to an advantageous state for the player for a certain period of time rather than the normal game state. As for such prizes, there are a big bonus (hereinafter referred to as "BB"), which allows a certain number of games serving relatively a bigger return to the player, and a regular bonus (hereinafter referred to as "RB"), which allows a certain number of games serving relatively a smaller return to the player.

[0010] Further, in the pachi-slo gaming apparatus X, a combination of symbols that lines up along the active winning lines 111 to 113 (hereinafter referred to as "active line") is internally sampled (hereinafter referred to as "internal sampling"), and winning is determined based on the result of internal sampling and a timing when the player performs a stopping operation by pushing of the reel stop buttons 107 to 109.

[0011] In other words, in order to win a prize which medals or coins are paid out, it is necessary that winning as a result of internal sampling (hereinafter referred to as "internally winning"), and that the player performs the stopping operation at a timing that allows lining up of the combination corresponding to the prize acquired by internally winning (hereinafter referred to as "internally winning prize") along the active line(s).

[0012] It means that even if the internally winning is achieved, the prize is not awarded in a case where the timing of the stopping operation is not appropriate. Therefore, a technique of performing the stopping operation in a timely manner (which is called "see-and-push" and which intervention of player's technique is high) is required, and such a type of pachi-slo gaming apparatus has become major today.

[0013] Regarding such a type of pachi-slo gaming apparatus, various techniques have been recently proposed to display the symbols as well as the winning lines 111 to 113 on the face panel 100 in order to improve attractiveness and to ease identification of the winning prizes.

[0014] For example, in the gaming apparatus described in the Japanese patent publication No. H4-220276, three pairs of LCD shutters are placed in a row in front of a display window corresponding to the three reels and displaying a winning symbol combination at completion of the game. On the other hand, the gaming apparatus activates the LCD shutter to conceal corresponding to the six rest positions that display non-winning symbols so as to display only the winning symbol com-

bination.

[0015] Further, in the gaming apparatus described in the Japanese patent publication No. P2000-350805, an information display panel having some transparency is placed on the rear or close to the rear of the face panel and is configured with a matrix display unit enabling display by a dotted pattern using dots formed by a plurality of lines and columns. Moreover, the information display panel is configured by a transparent electronic luminescent (EL) panel in order to display characters and symbols, etc. on the panel by a dotted pattern.

[0016] However, in the gaming apparatus comprising the above described LCD shutters (i.e., Japanese patent publication No. H4-220276), although the winning symbol combination can be clearly displayed by concealment of the non-winning symbols, a lot of winning lines including lines that are not active are continuously displayed. It is therefore difficult to view the symbols on the respective reels. Further, it is required to additionally integrate a variety of indication lamps and indicators, etc., which causes the structure of the gaming apparatus to become complex.

[0017] Further, in the gaming apparatus comprising the information display panel (i.e., Japanese patent publication No. P2000-350805), although display of only the active lines and various information including images for entertainment can be accomplished, the symbols of the respective reels are viewed through the dotted pattern because the information display panel is transparent.

[0018] Accordingly, it is a problem that both the images for entertainment and the symbols of the respective reels may not be displayed clearly.

[0019] The document US-A-2001/0031658 discloses the features of the preamble of claim 1.

BRIEF SUMMARY OF THE INVENTION

[0020] The present invention has been made in view of the above problem, and thus has an object of providing a gaming apparatus, which enables viewing of the symbols of the reel and the images for entertainment, etc. that are displayed on the front side display unit, selectively and clearly as required.

[0021] Claim 1 discloses the present invention. Preferred embodiments are disclosed in claims 2-3.

BRIEF DESCRIPTION OF THE SEVERAL VIEWS OF THE DRAWINGS

[0022]

Fig. 1 is diagram showing an example of a conventional gaming apparatus;
Fig. 2 is a perspective view showing an exterior of the slot machine according to the embodiment of the present invention;
Fig. 3 is a front side view showing an exterior of the slot machine according to the present invention;
Fig. 4 is a block diagram showing circuit configuration of the slot machine according to the embodiment of the present invention;
Fig. 5 is a block diagram showing a sub controller of the slot machine according to the embodiment of the present invention;
Fig. 6 is a diagram showing a symbol string arranged on the reel;
Fig. 7 is a diagram showing prizes and the number of paid medals corresponding to the winning symbol combinations;
Fig. 8 is a diagram showing an example of a ceiling indicator;
Fig. 9 is a diagram showing an example of an image notifying an order of stopping reels;
Fig. 10A is a diagram showing a probability-sampling table;
Fig. 10B is a diagram showing a probability-sampling table;
Fig. 11 is a diagram showing a stopping control table number selection table;
Fig. 12 is diagram showing a relationship between an order of a stopping operation and winnings;
Fig 13 is a diagram showing an example of a stopping control table;
Fig. 14 is a diagram showing an example of a stopping control table;
Fig. 15 is a diagram showing an example of a stopping control table;
Fig. 16A is a diagram showing a table for ceiling-AT quantities selection;
Fig. 16B is a diagram showing a table for ceiling-AT implementation sampling;
Fig. 17A is a diagram showing a table for ceiling standard value selection;
Fig. 17B is a diagram showing a table for transition to ceiling;
Fig. 18 is a diagram showing an example of commands transmitted from a main controller to a sub controller;
Fig. 19 is a diagram showing an example of commands transmitted from a main controller to a sub controller;
Fig. 20 is a flowchart showing a process of a main controller;
Fig. 21 is a flowchart showing a process of a main controller;
Fig. 22 is a flowchart showing a process of a main controller;
Fig. 23 is a flowchart showing a process of a main controller;
Fig. 24 is a flowchart showing a process of a main controller,
Fig. 25 is a flowchart showing a process of a main controller;
Fig. 26 is a flowchart showing a stopping control table selection process;
Fig. 27 is a flowchart showing a process of a sub

controller;
Fig. 28 is a flowchart showing a process of a sub controller;
Fig. 29A is a flowchart showing a inserted medals update process;
Fig. 29B is a flowchart showing a bet medals determination process;
Fig. 29C is a flowchart showing total bet medals update process;
Fig. 29D is a flowchart showing a total paid update process;
Fig. 30 is a flowchart showing a ceiling indicator indication process;
Fig. 31 is a flowchart showing a ceiling-AT start check process;
Fig. 32 is a flowchart showing a ceiling start-value selection process;
Fig. 33 is a flowchart showing a ceiling-AT execution process;
Fig. 34 is a flowchart showing a pushing order notification process;
Fig. 35 is a flowchart showing a ceiling-AT implementation sampling process;
Fig. 36 is a diagram explaining a panel display unit;
Fig. 37 is a diagram explaining an arrangement of the panel display unit;
Fig. 38 is a diagram explaining an LCD shutter that can conceal an arbitrary position;
Fig. 39 is a diagram explaining an LCD shutter that can conceal a prescribed position;
Fig. 40 is a diagram explaining an LCD shutter that can conceal a prescribed position;
Fig. 41 is a diagram explaining an example of structure of a mechanical shutter;
Fig. 42A is a diagram explaining an example of structure of a mechanical shutter; and
Fig. 42B is a diagram explaining an example of structure of a mechanical shutter.

DETAILED DESCRIPTION OF THE INVENTION

[0023] The gaming apparatus of the present invention comprises a variable display unit configured to variably display a plurality of symbols, a front side display unit located in front of the variable display unit and configured to enable viewing of the symbols displayed by the variable display unit, a concealing unit located between the variable display unit and the front side display unit and configured to temporarily conceal the display of the variable display unit, an internally winning prize determiner configured to determine an internally winning prize, a stopping controller configured to stop the varying of display of the variable display unit based on a result of determination by the internally winning prize determiner, and wherein, a prize is awarded if a stopped state displayed on the variable display unit, which is caused by the stopping controller, matches a prescribed stopped state.

[0024] In other words, since the concealing unit which temporary conceals the display of the variable display unit is located between the variable display unit configured by a plurality of spinning reels and the like for displaying the symbols, and the front display unit for displaying a certain object including an image and an equivalent of a lamp, the symbols of the variable display unit is not viewed and thus only the objects displayed on the front display unit can be viewed if a certain position is concealed by activation of the concealing unit.

[0025] On the other hand, if the concealing unit is not activated, the symbols of the variable display unit are viewed, and for example, the symbols of the variable display unit can be clearly displayed if no objects are displayed on the front display unit

[0026] As described above, according to the gaming apparatus, objects can be displayed using either the front display unit or the variable display unit on a case-by-case basis so that the recognition of the objects by the player is increased drastically.

[0027] It is feasible that the concealing unit comprises a shutter which can conceal an arbitrary position. It means that an image displayed on the front display unit can be distinguished if only the rear side of the image is concealed and viewing of the variable display unit is enabled on an area where the image is not displayed.

[0028] It is also feasible that the shutter comprises a panel configured by a liquid crystal display or a transparent electronic luminescent display. In this case, a thin and compact structure of the shutter can be achieved. Further, since a motion animation can also be displayed, various information can be displayed.

[0029] Further, the concealing unit may comprise a shutter which can conceal a prescribed position. In other words, a window is set to enable viewing of only the symbols of the variable display unit and to conceal the display other than the window. In this case, a mechanical type of the shutter, which comprises a slidable non-transparent sheet may also be realized.

[0030] Here, the mechanical type of the shutter may comprise the non-transparent sheet having a plane surface, and which is slidable and can conceal the whole area of the front display unit. Further, the sheet may have a prescribed opening area, or may be configured by a pair of slidable sheets separated horizontally or vertically to open and close freely.

[0031] Further, the mechanical type of the shutter may also comprise a film that has a prescribed opening area, and the rolling upward and downward of which film is possible.

[0032] Therefore, it is possible that the prescribed area can be switched to be viewed or to be concealed as appropriate if the mechanical type of the shutter which has the prescribed opening area is activated (i.e., sliding, rolling upward/downward).

[0033] In addition, in the case where the shutter configured by the non-transparent sheet and the front display unit is configured by an LCD, the shutter can function as

a reflector for the LCD. Similarly, in the case where the shutter configured by the panel and the front display unit is configured by an LCD, the shutter can also function as a reflector for the LCD if the panel is a reflective type and is not transparent.

[0034] Hereinafter, a gaming apparatus according to the embodiment will be described in detail with reference to associated drawings.

[0035] Fig. 2 is a perspective view showing an exterior of a gaming apparatus 1 according to an embodiment of the present invention, and Fig. 3 is a front side view of the gaming apparatus 1.

[0036] The gaming apparatus 1 comprises three spinning reels which variably display symbols, a so-called "pachi-slo machine". A game can be played using a token (coin or medal), or game media, e.g., a card, storing information regarding the value of the game which has been or is to be given to a player. Hereinafter, it is assumed that medals are utilized for playing the game.

[0037] A panel display unit 5, which comprises an LCD and which is the essential part of the present invention, is placed in the middle of a cabinet 2 that forms the gaming apparatus 1.

[0038] Further, three spinning reels 3L, 3C, 3R are placed in a line in the cabinet 2 and a symbol string formed by a plurality of the symbols are shown on the circumference of the respective reels. The spinning reels 3L, 3C, 3R configure the variable display unit in the embodiment. The symbols of the respective reels can be viewed through display windows 4L, 4C, 4R and the panel display unit 5. The respective reels spin at a constant speed (e.g., 80 rpm).

[0039] Although configuration of the panel display unit 5, which is the essential part, will be described later, a display screen 5a, which is configured by an LCD and enables viewing of the spinning reels 3L, 3C, 3R, is placed entirely on the panel display unit 5. The display screen 5a configures the front side display unit in the embodiment and the following elements appear from a player point of view.

[0040] The oblong display windows 4L, 4C, 4R in the middle of the display screen 5a can be viewed by the player. Further, a centerline 8a, a top line 8b and a bottom line 8c, which are horizontally drawn, and a cross-down line 8d and across-up line 8e, which are diagonally drawn can also be viewed on the display windows 4L, 4C, 4R. One, three or five winning lines become active by either an operation of a 1-BET switch 11, a 2-BET switch 12, a MAX-BET switch 13 or insertion of medals to a medal insertion slot 22. The line being active can be identified by lighting of the line and a BET lamps 9a, 9b, 9c.

[0041] Specifically, the 1-BET lamp 9a, the 2-BET lamp 9b, the MAX-BET lamp 9c and a credited medal indicator 19 are placed at the left side of the display windows 4L, 4C, 4R. The 1-BET lamp 9a, the 2-BET lamp 9b and the MAX-BET lamp 9c light according to the number of bet medals (hereinafter referred to as "BET No.") for a single game. Here, in the embodiment, a single game is completed when all the reels have stopped spinning, or the game media is paid out if that is the case.

[0042] The 1-BET lamp 9a lights if the BET No. is one, and one winning line has become active. The 2-BET lamp 9b lights if the BET No. is two, and three winning lines have become active. The MAX-BET lamp 9c lights if the BET No. is three, and all the winning lines (i.e., five lines) have become active. Further, a start acceptance lamp 25 lights if, at least, one winning line has become active. Moreover, the credited medal indicator 19 indicates the number of credited medals.

[0043] A WIN lamp 17, a payouts indicator 18 and a medal acceptance lamp 24 are placed at the right side of the display windows 4L, 4C, 4R. The WIN lamp 17 lights with a prescribed probability if the internally winning of BB or RB occurs. The WIN lamp 17 also lights if the player wins BB or RB. The payouts indicator 18 is configured by a seven-segment LED and indicates the number of medals to be paid out at winning the prize. The medal acceptance lamp 24 blinks when insertion of the medal can be accepted.

[0044] A bonus game counter 20 is placed at the upper right side of the display screen 5a. The bonus game counter 20 indicates the number of RB games and the number of possible RB game winnings, etc., which will be described later.

[0045] A game-stop indicator 31, a replay indicator 32, an RB indicator 33 and a BB indicator 34 are placed in a line at the upper left side of the display screen 5a. The game-stop indicator 31 lights if the elapsed time from the spinning of the reels last time is less than a prescribed time (4.1 seconds in the embodiment). The replay indicator 32 lights when a replay is allowed. The RB indicator 33 lights while RB is in progress and the BB indicator 34 lights while BB is in progress.

[0046] Further, in a case where the internally winning of the "bell prize" occurs during the "stopping operation assist-time (AT)", the "order of stopping reels" for achievement of the prize is also displayed on the display screen 5a.

[0047] A base 10 is formed below the display windows 4L, 4C, 4R and an indication unit 2a, which displays information regarding the gaming apparatus 1, is placed between the base 10 and the display windows 4L, 4C, 4R.

[0048] Further, the medal insertion slot 22 is placed at the right side of the indication unit 2a, and the 1-BET switch 11, the 2-BET switch 12 and the MAX-BET switch 13 are placed at the lower left position of the indication unit 2a. In addition, a control button 26, an okay button 27 and a cancel button 28 are placed at the upper left position of the indication unit 2a.

[0049] If the 1-BET switch 11 is pushed, one medal is bet from the credited medals. If the 2-BET switch 12 is pushed, two medals are bet from the credited medals. Similarly, if the MAX-BET switch 13 is pushed, the maximum allowed number of medals is bet. The prescribed winning lines are to be active by an operation of the BET switches as described above.

[0050] Moreover, switching of the image displayed on the display screen 5a and input of information can be performed using the control button 26, the okay button 27 and the cancel button 28.

[0051] At the left side of the front face of the base 10, a credited medal settlement switch 14 in order for the player to credit/pay out the medals is placed. Medals are paid out from a medal payout slot 15 and stored in a medal tray 16 by an operation of the credited medal settlement switch 14. A start lever 6, which moves freely within prescribed angles and accepts an operation of the player, is mounted at the right side of the credited medal settlement switch 14 to start variably display the symbols of the reels in the display windows 4L, 4C, 4R (i.e., to start a game).

[0052] At the left side of the front face of the base 10, a door opening/forced game-over reset unit 29 is placed. The door opening/forced game-over reset unit 29 allows opening of the front door if a prescribed key is inserted and turned to the right, and resets the forced game-over if the prescribed key is inserted and turned to the left.

[0053] Speakers 21L, 21R are placed at the upper left and right side of the cabinet 2. A payout table panel 23, which indicates winning symbol combinations and the number of medal to be paid out, is placed between the speaker 21L and 21R. In the middle of the front face of the base 10 and the lower side of the indication unit 2a, stop buttons 7L, 7C, 7R to stop the spinning reels 3L, 3C, 3R are placed,

[0054] In the gaming apparatus 1 described above, the characteristic of the present invention is that a concealing unit to temporarily conceal the display of the spinning reels 3L, 3C, 3R is placed between the spinning reels 3L, 3C, 3R, which configures the variable display unit, and the display screen 5a, which configures the front side display unit. Hereinafter, configuration of the display screen 5a, which is the essential part of the present invention, will be described.

[0055] As shown in Fig. 36, the display screen 5a according to the embodiment is configured by a multiple layer panel 5', which is clamped by a frame 505.

[0056] The multiple layer panel 5' is configured by multiple layers, such as a protection glass 500 and an LCD panel 501, both of which substantially configure the front side display unit, an LCD shutter 502, which configures the concealing unit, an acrylic panel 503 having a prescribed thickness, which configures a part of a backlight structure, and a reflector 504, which is formed by a plastic film attached to the acrylic panel 503. Incidentally, it is preferred that a surface of the reflector 504 is processed so as to be uneven in order for the beam to scatter. Further, a transparent acrylic panel may be used instead of the protection glass 500.

[0057] In addition, as shown in Fig. 37, the multiple layer panel 5' is mounted to a front opening area 2b from the rear side, and the portion disclosed from the cabinet 2 configures the display screen 5a. Incidentally, the notations 2c, 2c' show upper and lower bosses and the notation 2d shows a screw for mounting the panel.

[0058] Below the multiple layer panel 5', a cold cathode fluorescent lamp (CCFL) 2e, which functions as the backlight of the LCD panel 501 and lights up the symbols of the spinning reels 3L, 3C, 3R is placed.

[0059] Specifically, the CCFL 2e is positioned at the bottom of the acrylic panel 503, and the frame 505 has a notch 505a for the beam of the CCFL 2e to pass through from the bottom of the acrylic panel 503. Thus, the beam of the CCFL 2e can light up the whole area of the acrylic panel 503 and can scatter towards the front side via the reflector 504. The CCFL 2e therefore functions as a backlight of the LCD panel 501 and the LCD shutter 502.

[0060] Further, the beam of the CCFL 2e also lights up the spinning reels 3L, 3C, 3R, which are positioned behind the multiple layer panel 5'. In Fig. 37, a notation 2f shows a reflecting cover which surrounds the CCFL 2e and has U-shaped cross-section. The reflecting cover is mounted to the lower boss 2c' together with the multiple layer panel 5'.

[0061] As described above, in the embodiment, the LCD panel 501 and the LCD shutter 502 are layered, and the respective symbols of the spinning reels 3L, 3C, 3R, which configure the variable display unit can be viewed from the side of the front display unit configured by the LCD panel 501 and the LCD shutter 502 in a normal state that means the LCD shutter 502 is not activated. Further, viewing of the symbols is temporarily concealed by activation of the LCD shutter 502 so as to display the image displayed on the LCD panel 501 more clearly by concealment of the spinning reels 3L, 3C, 3R.

[0062] As the LCD shutter 502, a transparent EL panel may be utilized instead of an LCD panel having the same structure of the LCD panel 501.

[0063] Further, as shown in Fig. 38, an arbitrary position of the display screen 5a can be concealed if the shutter is electronically realized by the LCD shutter 502 or the transparent EL panel. Thus, information that needs to be displayed to the player (an image A in Fig. 38) can be clearly displayed on the position where the shutter is activated.

[0064] In other words, as shown, since the rear side of the image A is concealed by the LCD shutter 502, the symbols of the spinning reels 3L, 3C, 3R cannot be viewed. On the other hand, the symbols of the spinning reels 3L, 3C, 3R can be continuously viewed through the display screen 5a except for the image A. Incidentally, the image A is not limited to such image and may be the above described winning lines, lamps and indicators.

[0065] Moreover, a shutter that conceals a prescribed position of the display screen 5a can also be realized instead of the concealment of the arbitrary position of the display screen 5a.

[0066] Specifically, as shown in Fig. 39, an LCD shutter 502' which a prescribed area 3' are opened is used so that the spinning reels 3L, 3C, 3R can be viewed. Concealment or non-concealment of the area except the prescribed area 3' can be switched by electric turning on/off.

In this case, the symbols of the spinning reels 3L, 3C, 3R are always viewed even the shutter is activated. Incidentally, the prescribed area 3' can be set as appropriate, and opening areas corresponding to the respective viewed symbols may be set as shown in Fig. 40 for example.

[0067] Further, concealment or non-concealment of the whole area may be executed without having the prescribed area 3'. In this case, the whole area is concealed when object is displayed on the LCD panel 501 so as to conceal the symbols of the spinning reels 3L, 3C, 3R whereby the object is clearly displayed on the LCD panel 501. In addition, if the LCD panel 501 is a reflective type, it is expected that the LCD panel 501 functions as a reflector when the LCD shutter 502' is activated.

[0068] In either cases, since the shutter is electronically realized, a thin and compact structure of the shutter can be achieved. Further, since a motion animation can also be displayed, various information can be displayed.

[0069] Incidentally, as another embodiment of the concealing unit, a mechanical type of shutter can also be realized.

[0070] Specifically, in this case, the panel display unit 5 has configuration that the LCD shutter 502 is excluded from the multiple layer panel 5'. As shown in Fig. 41, the shutter may have non-transparent sheets 510 which are slidable and is placed between the panel display unit 5 and the spinning reels 3L, 3C, 3R. Here, a pair of the non-transparent sheets 510, which is connected with a motor for driving, is placed at the upper and the lower side so as to open or close freely. If the LCD panel 501 is also a reflective type in this case, the non-transparent sheets 510 are used as reflectors.

[0071] In addition to the above, as a different embodiment, it may be configured by a film 520, which has a shape of a belt as shown in Fig. 42A.

[0072] As shown in Fig. 42B, the film 520 has a prescribed length and is configured so that rolling upward and downward arc possible over a certain area corresponding to the panel display unit 5. The film 520 has the area that can conceal the whole area of the LCD panel 501 in the middle, and a hole 530, which has a prescribed shape, are made in the upper and the lower side.

[0073] By applying the above configuration, if rolling upward or downward of the film 520 is performed, it is possible that the whole area of the display screen 5a is concealed, or only a prescribed position is concealed, whereby a shutter function can provided.

[0074] Incidentally, if the LCD panel 501 is also a reflective type in this case, the film 520 is used as a reflector. Further, a motor may be used to roll upward or downward the film 520.

[0075] Hereinafter, an operation to spin the spinning reels 3L, 3C, 3R using the start lever 6, and to stop spinning of the spinning reels 3L, 3C, 3R respectively using the three stop buttons 7L, 7C, 7R will be described.

[0076] In the embodiment, a stopping operation performed when all the spinning reels 3L, 3C, 3R are spinning is called a "first stopping operation", a stopping operation performed the following is called a "second stopping operation", and a stopping operation performed after the "second stopping operation" is called a "third stopping operation".

[0077] Further, pushing the left stop button 7L as the "first stopping operation" is called "regular-order pushing", pushing the center stop button 7C as the "first stopping operation" is called "center-start pushing", and pushing the right stop button 7R as the "first stopping operation" is called "reverse-order pushing".

[0078] Since the three stop buttons 7L, 7C, 7R are placed in the gaming apparatus 1, the order of the operation becomes six ways. The order of the operation is then classified as follows.

[0079] Here, the left stop button 7L is abbreviated as "L", the center stop button 7C is abbreviated as "C", and the right stop button 7R is abbreviated as "R". For descriptive purposes, the first stopping operation is indicated starting from the left. In other words, for example, if the left stop button 7L is pushed as the "first stopping operation", the center stop button is pushed as the "second stopping operation", and then the right stop button is pushed as the "third stopping operation", it is indicated as "L-C-R". As described, six ways of the stopping operation exist in the embodiment, such as "L-C-R", "L-R-C", "C-L-R", "C-R-L", "R-L-C" and "R-C-L".

[0080] Fig. 6 shows a symbol string, which is indicated on the spinning reels 3L, 3C, 3R, and which has 21 segments formed by a plurality of the symbols. A code number in a range of "00 to 20" is assigned to each symbol and is stored in a program ROM 42 as data table. The symbol string formed by a "RED7", "BLUE7", "BAR", "BELL", "PLUM", "REPLAY" and "CHERRY" is indicated on the respective spinning reels 3L, 3C, 3R. The spinning reels 3L, 3C, 3R spin as the symbol string moves to the direction indicated by the arrow in Fig. 6.

[0081] Fig. 7 shows prizes to be awarded and the number of medals to be paid out corresponding to the winning symbol combinations.

[0082] The game state is divided into three states, such as the "normal game state", the "normal game state in BB state", and the "RB game state".

[0083] Although there is a case where the normal game state is further divided based on either the internally winning of BB or RB occurs, prizes to be awarded by the internally winning are similar to the three states as shown in Fig. 7.

[0084] Incidentally, the type of prizes awarded by the internally winning is determined by a probability-sampling table (the probability sampling table will be described later). The probability sampling tables are provided for the respective game states. This means that the same type of prizes is awarded by the internally winning in the same game state.

[0085] As shown in Fig. 7, in the normal game state, if "RED7-RED7-RED7" or "BLUE7-BLUE7-BLUE7" lines

up along the active line, BB is acquired together with payout of 15 medals, and then the game state starting from the next game becomes the BB state.

[0086] The "RB game state" occurs when "BAR-BAR-BAR" lines up along the active line during the "normal game state", or "REPLAY-REPLAY-REPLAY" lines up along the active line during the "normal game state in the BB state" (which is called "JAC IN"). At this point in time, 15 medals are paid out. The "RB game state" is a game state in which "REPLAY-REPLAY-REPLAY" easily lines up so as to win the prize that pays out 15 medals if one medal is bet. A maximum of 12 games are allowed in the RB game state (which is called "allowed RB games"). Further, winning the prize can be allowed up to 8 times during the RB game state (which is called "allowed RB game winnings"). This means that the RB game state is completed when the number of games reaches 12 times or the number of winning reaches 8 times. The game state is transferred to the normal game state as soon as the RB game state is completed.

[0087] The BB state completes when 30 games under the normal game state in BB state are complete, or the third RB is completed after transfer to the RB game state three times during the BB state. The game state is then transferred to the normal game state as soon as the BB state is completed.

[0088] In the normal game state, a game replay is awarded if "REPLAY-REPLAY-REPLAY" lines up along the active line. Since the same number of inserted medals as the last game is automatically inserted if the replay is awarded, the player can play a game without betting medals.

[0089] In the normal game state or the normal game state in BB state, "Bell prize" is awarded if "BELL-BELL-BELL" lines up along the active line. Whether the prize is awarded or not when the internally winning of the "Bell prize" has occurred is determined based the table number, which will be described later, and the order of pushing the stop buttons 7L, 7C, 7R by the player.

[0090] Specifically, the "BELL-BELL-BELL" lines up along the active line and the "Bell prize" is awarded only if the stopping operation is performed according to the order of operation corresponding to the table number selected from the six ways. If the stopping operation is performed by one of the other five orders, the "Bell prize" is not awarded.

[0091] In addition, it is possible that the "Plum prize" and the "Cherry prize" are awarded during the normal game state and the normal game state in BB state, and the number of medals to be paid out is as shown in Fig. 7.

[0092] If the internally winning of the "Bell prize" occurs during the normal game state, the "stopping operation assist-time (AT)", in which the order of the operation to acquire the prize is notified, is provided. Therefore, the player will certainly acquire the prize if the internally winning of "Bell prize" occurs during the "stopping operation assist-time (AT)".

[0093] Fig. 8 is a diagram explaining an example of the "ceiling indicator", which indicates the process by which relieving of the player is implemented. The scale shown in Fig. 8 indicates difference between the total number of consumed medals and the total number of paid medals. In other words, during the normal game state, since consumed medals are larger than paid medals normally, the level of the ceiling indicator increases accordingly until the bonus game is awarded. The ceiling indicator indicates the level "1" when BB is completed, and the relieving of the player, which is called "ceiling", is implemented as soon as it reaches the level "8".

[0094] The ceiling indicator is displayed on the display screen 5a in the embodiment, and the rear of the indicator is concealed by activation of the LCD shutter 502 so as to view the ceiling indicator very clearly.

[0095] Hereinafter, with reference to Fig. 9, the images displayed on the display screen 5a if the internally winning of the "Bell prize" occurs during the AT (assist-time), i.e., the images notifying the order of the operation, will be described.

[0096] The rear of the displayed image is also concealed in this case by activation of the LCD shutter 502 so as to view the displayed object very clearly. It is assumed in Fig. 9 that the operation in the order of the "L-R-C" is required to acquire the prize.

[0097] The Fig. 9 (1) shows the image to be displayed at the start of the game. The symbol of a bell is displayed on the left side area, which notifies that the internally winning of the "Bell prize" has occurred. Further, the "=LEFT= PUSH!" message is displayed below the symbol and notifies to push the left stop button 7L as the " first stopping operation" to acquire the prize.

[0098] The Fig. 9 (2) shows the image to be displayed after the "first stopping operation" is performed. The symbol of a bell is displayed on the right side area, and the "=RIGHT= PUSH!" message is displayed below the symbol and notifies to push the right stop button 7R as the " second stopping operation".

[0099] The Fig. 9 (3) shows the image to be displayed after the "second stopping operation" is performed. The symbol of a bell is displayed in the middle, and the "=CENTER= PUSH!" message is displayed below the symbol and notifies to push the center stop button 7C as the " third stopping operation". If the first and second stopping operations are performed according to the messages displayed on the display screen 5a, the "BELL-BELL-BELL" lines up along the active line after the third stopping operation and then the "Bell prize" is awarded.

[0100] It is to be noted that in Fig. 9, as the mode of notifying the order of the operation, although the stop button to be pushed is notified one after the other, the order of the operation may be notified at once at the start of the game. For example, the "L-R-C" can be displayed on the display screen 5a as the order of the operation.

[0101] Fig. 4 shows circuit configuration including a main controller 81 for controlling the processes of the game in the gaming apparatus 1, peripheral units (actuator) electrically connected to the main controller 81, and

a sub controller 82 for controlling the panel display unit 5 as well as the speakers 21L, 21R based on the instruction transmitted by the main controller 81.

[0102] The main controller 81 is mainly configured by a microcomputer 40, and circuits for a random number sampling are added. The microcomputer 40 includes a CPU 41 for performing controls according to the preset program, and the program ROM 42 as well as a RAM 43 as a storing means.

[0103] A clock pulse generator 44 as well as a divider 45 for generating a base clock pulse and a random number generator 46 as well as a sampling circuit 47 for generating a random number to be sampled are connected to the CPU 41. The sampling of the random number may be performed in the microcomputer 40, i.e., the sampling may be performed on the program running on the CPU 41. In this case, the random number generator 46 and sampling circuit 47 can be omitted, or they may remain to back up the sampling performed in the CPU 41.

[0104] In the program ROM 42, the probability-sampling table for the sampling of the random number performed when the start lever 6 is operated (a start operation), a " stopping control table" for determination of a stopped state of the reels depends on an operation of the stop buttons, and various instructions (commands) for transmitting to the sub controller 82 are stored. As for the commands, for example, there are a "demonstration display command", a "start command", an "all reels stop command" and a "winning command". These commands will be described later. Incidentally, the sub controller 82 does not transmit a command to the main controller 81, and communication is initiated only from the main controller 81 to the sub controller 82.

[0105] In the circuit shown in Fig. 4, as an actuator controlled based on a control signal transmitted by the microcomputer 40, there are a hopper 50, which accepts medals and pays out a prescribed number of medals as a game value serving means, based on instructions from a hopper driving circuit 51 and stepping motors 59L, 59C, 59R for driving the spinning reels 3L, 3C, 3R.

[0106] Further, a motor driving circuit 49 for driving the stepping motors 59L, 59C, 59R, the hopper driving circuit 51 for driving the hopper 50, a lamp driving circuit 55 for driving lamps, and a display driving circuit 58 for driving the display units are connected to the output port of the CPU 41 via an I/O port 48. These driving circuits control the respective actuators based on a received control signal from the CPU 41.

[0107] Moreover, as an input signal generating means for generating a required input signal for the microcomputer 40 to generate instructions, there are a start switch 6S, the 1-BET switch 11, the 2-BET switch 12, the MAX-BET switch 13, the credited medal settlement switch 14, an inserted medal sensor 22S, a reel stop signal circuit 56, a reel position detecting circuit 60 and a payout completion signal circuit 61, and they are also connected to the CPU 41 via the I/O port 48.

[0108] The start switch 6S detects the operation of the start lever 6. The inserted medal sensor 22S detects the medal inserted into the medal insertion slot 22. The reel stop signal circuit 56 generates a stop signal according to the operation of the stop buttons 7L, 7C, 7R. The reel position detecting circuit 60 receives a pulse from a reel-spinning sensor and provides the CPU 41 with a signal for detecting the positions of the spinning reels 3L, 3C, 3R. The payout completion signal circuit 61 generates a signal, which detects completion of a medal payout, when the count measured by a medal detector 50S reaches a prescribed number.

[0109] In the circuit shown in Fig. 4, the random number generator 46 generates a random number within a certain range, and the sampling circuit 47 samples a single random number at an appropriate timing after the start lever 6 is operated. Internally winning is then determined based on the sampled random number and the probability-sampling table stored in the program ROM 42. After the internally winning is determined, a random number is again sampled in order to select the stopping control table.

[0110] After spinning of the spinning reels 3L, 3C, 3R is started, the number of driving pulses supplied to the respective stepping motors 59L, 59C, 59R is counted, and the counted number is written to the RAM 43. A reset pulse is transmitted every single rotation from spinning reels 3L, 3C, 3R and is inputted to the CPU 41 via the reel position detecting circuit 60. The reset pulse then clears the counted number of driving pulses stored in the RAM 43. Therefore, the counted numbers corresponding to the position within a single rotation for the respective spinning reels 3L, 3C, 3R are stored in the RAM 43.

[0111] A symbols table is stored in the program ROM 42 in order to correlate the position of the spinning reels 3L, 3C, 3R with the symbols indicated on the circumference of the reel. In the symbols table, the code number, which is assigned per a certain rotating pitch of the spinning reels 3L, 3C, 3R, and a symbols code, which indicates the symbols that correspond to the respective code numbers, are correlated.

[0112] Further, a winning symbol combinations table is stored in the program ROM 42. In the winning symbol combinations table, a winning symbol combination, the number of medals to be paid out and a winning determination code for determination of the winning are correlated. The winning symbol combinations table is referred when the spinning reels 3L, 3C, 3R is controlled to stop and when the winning is confirmed after all the reels stopped.

[0113] If the internally winning occurs as the result of the sampling (the probability sampling process), the CPU 41 transmits a signal to the motor driving circuit 49 to stop the spinning reels 3L, 3C, 3R based on a signal transmitted by the reel stop signal circuit 56 when the stop buttons 7L, 7C, 7R are operated by the player and the selected winning symbol combinations table.

[0114] If the stopped state matches the symbol combination determined as the result of the internally winning,

the CPU 41 transmits a signal instructing payout to the hopper driving circuit 51 and the hopper 50 pays out a prescribed number of medals. At this point in time, the medal detector 50S counts the number of medals paid by the hopper 50 and a signal, which notifies completion of medal payout, is inputted to the CPU 41 when the counted number reaches the specified value. The CPU 41 then deactivates the hopper 50 via the hopper driving circuit 51 so as to complete the medal payout process.

[0115] A block diagram in Fig. 5 shows configuration of the sub controller 82. The sub controller 82 controls lighting of the lamps (the 1-BET lamp 9a, the 2-BET lamp 9b, the MAX-BET lamp 9c and the WIN lamp 17), display units (the payouts indicator 18, the credited medal indicator 19 and the bonus game counter 20) and the other various images displayed on the panel display unit 5. The sub controller 82 also controls the LCD shutter 502 and sounds outputted from the speakers 21L, 21R. Incidentally, in a case where the mechanical type of shutter is implemented, a motor for driving the shutter can also be controlled by the sub controller 82.

[0116] The sub controller 82 is deployed on a different circuit board from that of the main controller 81 and is mainly configured by a microcomputer 83 (hereinafter referred to as a "sub microcomputer 83"). Specifically, the sub microcomputer 83 is configured with an image control circuit 91 as a display controlling means for the panel display unit 5, a audio source IC 88 for storing audio sources outputted by the speakers 21L, 21R and a power amplifier 89.

[0117] The sub microcomputer 83 includes a sub CPU 84 for performing controls according to the instructions transmitted by the main controller 81, and a program ROM 85 as well as a work RAM 86 as the storing means. Although, a clock pulse generator, a divider, a random number generator and a sampling circuit are not installed in the sub controller 82, random number sampling is performed on a program running on the sub CPU 84.

[0118] The sub microcomputer 83 has a notifications counter and a ceiling-AT quantity stock counter, etc. in a prescribed area of its memory area. The notifications counter stores the number of remaining notifications of the order of pushing during the AT (assist-time). If the value of the counter is "1" or more, the ceiling-AT is implemented. The ceiling-AT quantity stock counter stores information regarding the number of remaining AT to be implemented.

[0119] The program ROM 85 stores a control program executed on the sub CPU 84. The work RAM 86 is configured as a temporary storing means when the sub CPU 84 executes the control program.

[0120] The image control circuit 91 is configured with an image control CPU 92, an image control work RAM 93, an image control program ROM 94, an image ROM 96, a video RAM 97 and an image control IC 98. The image control CPU 92 determines the content to be displayed on the panel display unit 5 according to an image control program stored in the image control program ROM 94 based on the parameters set by the sub microcomputer 83.

[0121] The image control program ROM 94 stores the image control program regarding the display on the panel display unit 5 and various tables for selection. The image control work RAM 93 is configured as a temporary storing means when the image control CPU 92 executes the image control program. The image control IC 98 produces an image depending upon the displayed content determined by the image control CPU 92 and outputs the image to the panel display unit 5. The image ROM 96 stores dot data for producing the image. The video RAM 97 is configured as the temporary storing means when the image control IC 98 produces the image.

[0122] Next, with reference to Figs. 10A and 10B, the probability-sampling table will be described.

[0123] The probability-sampling tables are referred during a probability sampling process. The table shown in Fig. 10A is used under the normal game state, and the table shown in Fig. 10B is used under the normal game state in BB state. The tables are used to determine the internally winning prize of each game.

[0124] Both tables have the range of random numbers from 0 to 16383, and the internally winning prize is determined using one of the values to be sampled from the range.

[0125] For example, under the normal game state, if the sampled value of the random number is "2851", the "Bell prize" is determined as the internally winning prize. Further, if the sampled value of the random number is in a range from 11036 to 16383, no prizes are to be awarded for the game.

[0126] Hereinafter, with reference to Fig. 11 through 15, the stopping control table, which is used when the internally winning of the "Bell prize" occurs, will be described.

[0127] The "stopping control table number selection table" shown in Fig. 11 is used to determine the table to be referred when the spinning reels 3L, 3C, 3R are controlled to stop while the internally winning of the "Bell prize" has occurred. Specifically, if the internally winning of the "Bell prize" occurs, one of the six tables is referred to, and the control for stopping the spinning reels 3L, 3C, 3R is performed based on the selected table.

[0128] Fig. 12 shows a relationship between the order of the stopping operation of the spinning reels 3L, 3C, 3R based on the selected table shown in Fig. 11 and winning of the "Bell prize". For example, the table No.1 is selected based on the "stopping control table number selection table" shown in Fig. 11, the "Bell prize" is awarded if the order of the operation follows "L-C-R". However, the "Bell prize" is not awarded if the order of the operation does not follow the "L-C-R". In other words, it is necessary that the internally winning of the "Bell prize" occurs and the order of the operation for pushing the stop buttons 7L, 7C, 7R follows the order specified by the selected table number.

[0129] Here, with reference to Fig. 13 through 15, a

detailed controlling method to stop the spinning reels 3L, 3C, 3R in a case where the internally winning of the "Bell prize" has occurred will be described.

[0130] In the stopping control table, the "position when the stop button is pushed" and the "controlled stop position" are indicated using a code number. The "position when the stop button is pushed" means the code number of the symbol positioned on the centerline 8a (specifically, the center of the symbol is positioned above the centerline 8a and is the closest to the centerline 8a.) when the stop buttons 7L, 7C, 7R, which correspond to the spinning reels 3L, 3C, 3R, are pushed.

[0131] The "controlled stop position" means the code number of the symbol to be displayed on the position of the centerline 8a when the reel stops due to the stopping operation. Here, in the embodiment, four (4) segments are assigned in the maximum for a so-called "slidable segments". For example, if the stop button 7R is pushed at the timing when the "CHERRY", which the code number of "12" is assigned, reaches the position of the centerline 8a while the spinning reel 3R is spinning, the spinning reel 3R can be controlled so as to stop the "BLUE7", which the code number of "08" is assigned, on the position of the centerline 8a.

[0132] Fig. 13 shows the stopping control table used for a case where the prize is to be awarded. The table is used when controlling the reel so as to line up the "BELL-BELL-BELL" along the active line for awarding the "Bell prize" after the internally winning of the "Bell prize" occurred.

[0133] In Fig. 13, the "controlled stop position" of the reel 3L is the code number of either "03", "08", "11", "15" or "19", which correspond to the "BELL" symbol. In Fig. 13, the "controlled stop position" of the reel 3C is the code number of either "03", "07", "11", "15" or "19", which correspond to the "BELL" symbol. Similarly, in Fig. 13, the "controlled stop position" of the reel 3R is the code number of either "01", "05", "10", "14" or "18", which correspond to the "BELL" symbol.

[0134] As described above, if the stopping control table shown in Fig. 13 is used for controlling the spinning reels 3L, 3C, 3R, the "BELL" symbol appears on the position of the centerline 8a, i.e., in the middle of the display windows 4L, 4C, 4R, which causes the prize to be awarded.

[0135] Fig. 14 shows the stopping control table used for the regular-order pushing and the center-start pushing in a case where the prize is missed after the internally winning of the "Bell prize" has occurred. The table is used when controlling the reel so as to not line up the "BELL-BELL-BELL" along the active line (the "Bell prize" is not awarded). Here, the controlled stop positions, which correspond to the positions when the stop button of the reel 3L and 3C are pushed, are basically the same as those shown in Fig. 13.

[0136] However, in Fig. 14, the controlled stop position of the reel 3R is the code number of either "02", "06", "11", "15" or "19", which corresponds to the "REPLAY".

[0137] As described above, if the stopping control table shown in Fig. 14 is used for controlling the spinning reels 3L, 3C, 3R, the "BELL" symbols appear in the middle of the display windows 4L and 4C, and the "REPLAY" symbol appears in the middle of the display window 4R, and it therefore causes the "Bell prize" not to be awarded.

[0138] Fig. 15 shows the stopping control table used for the reverse-order pushing and in a case where the prize is missed after the internally winning of the "Bell prize" occurs. The table is used when controlling the reel so as to not line up the "BELL-BELL-BELL" along the active line (the "Bell prize" is not awarded). Here, the controlled stop positions, which correspond to the positions when the stop button of the reel 3C and 3R are pushed, are basically the same as those shown in Fig. 13.

[0139] However, in Fig. 15, the controlled stop position of the reel 3L is the code number of either "04", "09", "12", "17" or "20", which corresponds to the "REPLAY".

[0140] As described above, if the stopping control table shown in Fig. 15 is used for controlling the spinning reels 3L, 3C, 3R, the "REPLAY" symbol appears in the middle of the display window 4L, and the "BELL" symbols appear in the middle of the display windows 4C and 4R, and it therefore causes the "Bell prize" not to be awarded.

[0141] In the embodiment, the six ways are adopted as the order of the stopping operation as described above, and the "BELL-BELL-BELL" lines up along the active line and the prize is then awarded only if the stopping operation is performed according to the order of the operation specified by the selected table number.

[0142] Therefore, it is possible that whether lining up of the "BELL-BELL-BELL" occurs or not is determined when the second stopping operation is performed. For example, there is a case where the table number "1" (the order of the operation is "L-C-R") shown in Fig. 12 is selected and the stop button 7L is then pushed to stop the reel 3L. It means that there is case whether lining up of the "BELL-BELL-BELL" occurs or not is not yet apparent at the first stopping operation. Because, it is still possible that the operation follows the "L-R-C" instead of "L-C-R", which causes the prize not to be awarded.

[0143] Further, in the embodiment, the "BELL-BELL-BELL" always lines up along the centerline 8a In the embodiment, two types of the stopping control tables are thus used for the case where the prize is missed as shown in Fig. 14 and 15. It is to be noted that if the table No. "2", "3", "4", "5" or "6" is selected, the "Bell prize" is to be awarded by performing the operation following the order of "L-R-C", "C-L-R", "C-R-L", "R-L-C" or "R-C-L", respectively.

[0144] Fig. 16A shows a "table for the ceiling-AT quantity selection" and Fig. 16B shows a "table for a ceiling-AT implementation sampling". The ranges of a random number are 0 to 4095 for "table for the ceiling-AT quantity selection", and 0 to 255 for the "table for a ceiling-AT implementation sampling".

[0145] Ten (10) games are allowed during the ceiling-AT and the "table for the ceiling-AT quantity selection" determines quantities of the ceiling-AT to be implement-

ed. Either "1", "2", "5", "10" or "30" times is selected by sampling.

[0146] In the table, the value is subtracted from the sampled random number starting from the upper column one after the other, and if the reminder becomes a negative number, the quantity corresponding to the column is set as the ceiling-AT quantity. For example, if the sampled random number is "4021", firstly, "2356" shown in the first column is subtracted from "4021" and the remainder becomes "1665". Since the remainder is a positive number, "1512" shown in the second column is further subtracted and the remainder becomes "153". Since the remainder is still a positive number, "196" shown in the third column is further subtracted and the remainder becomes "-43". Here, since the remainder becomes a negative number, the AT are set 5 times.

[0147] Further, the "table for a ceiling-AT implementation sampling" is used to determine whether or not the ceiling-AT is implemented. Here, if the "implement", which has the value "32", is selected, ten (**10**) games, in which an image notifying the order of the operation appears, are set. It means the ceiling-AT starts when the "implement" is selected. Incidentally, the method of sampling is the same as the "table for the ceiling-AT quantity selection" described above.

[0148] Fig. 17A shows a "table for ceiling start-value selection" and Fig. 17B shows a "table for transition to the ceiling". The range of a random number is **0** to 255 for the "table for ceiling start-value selection", and the value indicated in the "table for transition to the ceiling" means the differences, which are used to determine whether or not the level of the ceiling indicator increases.

[0149] Firstly, the "table for ceiling start-value selection" is used after the BB state is completed and determines the value of the difference, which causes the next implementation of the ceiling. If the value of "1200" in the table is selected, the ceiling, which is a sort of relieving of the player, is implemented when the difference between consumed medals and paid medals reaches 1200 pieces. Similarly, the ceiling is implemented when the difference reaches 1500 pieces if "1500" is selected, and 1800 pieces if "1800" is selected.

[0150] The "table for transition to the ceiling" is used to determine the level to be indicated on the ceiling indicator according to the table for ceiling start-value selection and the current difference of the medals. Specifically, the level to be indicated is selected by referring the value shown in the table based on the current difference and the selected value (i.e., 1200, 1500 or 1800 pieces) that causes implementation of the ceiling-AT. For example, if the value selected for implementation of the AT is 1200 pieces and the current difference reaches 821 pieces, level 5 is indicated. Further, if the difference reaches 900 pieces, level 6 is indicated.

[0151] Fig. 18 and 19 show lists of commands. These commands are mainly transmitted from the main controller 81 to the sub controller 82. The main controller 81 and the sub controller 82 are connected by 16 data signal lines and a signal line. The commands are configured by 2, 4 or 6 bytes, and are transmitted by a 1,2 or 3 step sequence.

[0152] In case of the start commands, the type of the internally winning prize, the game state and the selected stopping control table number for a case where the internally winning prize of the "BELL" are transmitted as a single command. The other commands are similar to the start commands. Further, commands shown in Fig. 18 and 19 are example and the other required information is also transmitted in order for sub controller 82 to perform control.

[0153] Hereinafter, with reference to Fig. 20 to 26, main flowcharts regarding the CPU 41 of the main controller 81 will be described.

[0154] Firstly, power is turned on (step 1/hereinafter referred to as "ST") and the CPU 41 initializes all the output ports (ST2). The CPU 41 then checks whether or not a "power-down error" occurs (ST3). Here, if a "power-down error" occurs, the process of ST2 is again performed. If no "power-down error" occurs, it is shifted to the process of ST4. In ST4, the CPU 41 itself is initialized. The CPU 41 then checks whether or not a "RAM error" has occurred (ST5). Here, if the "RAM error" has occurred, "RAM error" is indicated. Specifically, "*n*" is indicated on the payouts indicator 18 that is configured by a seven-segment LED. Incidentally, "RAM error" means that reading and writing using the RAM 43 is not properly working.

[0155] If no "RAM error" has occurred, the CPU 41 checks whether or not a key switch 63 for setting is turned on (ST6). If the key switch 63 is turned on, the CPU 41 performs a setting process configured by six stages (ST7) and then shifts to the process of ST12. If the key switch 63 is turned off, the CPU 41 shifts to the process of ST8. In the process of ST8, the CPU 41 checks whether or not a back-up battery works properly. If the back-up battery works properly, the CPU 41 clears addresses and an unused area of the RAM 43, and resumes the output-state when power was turned off (ST9). Further, the CPU 41 updates the input ports to the state when power is turned on, and resumes the state when power was turned off (ST10).

[0156] If the back-up battery does not work properly, the CPU 41 sets an initial value of parameters (ST11), and clears the entire area of the RAM 43 (ST12). The processes in ST12 and the followings of ST12 are also performed in a case where the process of ST7 is performed. The CPU 41 stores respective settings (ST13) and initializes communication data (ST14). The CPU 41 then clears a certain area of the RAM 43 when a game is completed (ST15). Further, the CPU 41 checks whether or not a request for automatic medal insertion exists (ST16). The request for automatic medal insertion exists if a replay was acquired at the last game. If the request exists, the CPU 41 automatically inserts the number of requested medals (ST17), transmits a medal insertion command to the sub controller 82 (ST18), and then shifts

to the process of ST20. If no request for automatic medal insertion exists, the CPU 41 accepts insertion of medals via the medal insertion slot 22 and the BET switches (ST19), and shifts to the process of ST20.

[0157] In the process of ST20, the CPU 41 checks whether or not the start lever 6 is turned, and checks whether or not 4.1 seconds are elapsed from the last game if the start lever 6 is turned (ST21). Specifically, the CPU 41 checks the value of a timer for monitoring a single game, which is set in the process of ST24. If 4.1 seconds are not yet elapsed, the CPU 41 waits until the next game is allowed (ST22) and then shifts to the process of ST23.

[0158] In the process of ST23, the CPU 41 selects a random number for sampling. Specifically, the CPU 41 selects a random number in a range from 0 to 16383. The CPU 41 then sets the timer for monitoring a single game (ST24), and performs a game state monitoring process (ST25). Further, the CPU 41 performs a probability sampling process (ST26). In the probability sampling process, the internally winning prize is determined based on the random number selected in ST23 and the probability-sampling table corresponding to the current game state determined in the game state monitoring process. As described above, the probability-sampling table specifies the random numbers, which causes the internally winning to occur for the respective prizes.

[0159] The CPU 41 then performs an internally winning notification process (ST27) and a stopping control table selection process (ST28). Further, the CPU 41 transmits the start command to the sub controller 82 as a transmission process when a game starts (ST29) and initializes the sub controller 82 for spinning the reels (ST30).

[0160] Further, the CPU 41 checks whether or not the stop buttons 7L, 7C, 7R are pushed (ST31). If the stop button is pushed, the CPU 41 shifts to the process of ST33. On the other hand, if the stop button is not pushed, the CPU 41 shifts to the process of ST32.

[0161] In the process of ST32, the CPU 41 checks whether or not the value of an automatic stop timer is "0". If the value is "0", the CPU 41 shifts to the process of ST33. On the other hand, if the value is not "0", the CPU 41 shifts to the process of ST31. In the process of ST33, the number of slidable segments is determined based on the request of winnings (i.e., the internally winning prize), the position of the symbol (i.e., the position of the reel when the stopping operation is performed) and the selected stopping control table, etc.

[0162] Then, the reel may be additionally rotated according to the number of slidable segments determined in ST33 (ST34). The CPU 41 sets a request to stop the reel (ST35) and transmits a reel stop command to the sub controller 82 (ST36).

[0163] Further, the CPU 41 checks whether or not all the reels have stopped (ST37), and then shifts to the process of ST38 if all the reels have stopped. If all the reels have not stopped, the CPU 41 shifts to the process of ST31. Then, an entertaining process, which notifies the end of game using an image and sound, is performed at the end of a game (ST38) and the CPU 41 searches for the prize to be awarded (ST39). Moreover, the CPU 41 checks whether a prize flag is correct or not (ST40) and shifts to the process of ST42 if it is correct. On the other hand, if the prize flag is not correct, an "illegal error" is indicated (ST41).

[0164] The CPU 41 then checks whether the number of medals awarded is "0" or not (ST42). Specifically, the CPU 41 checks which prize is awarded (excluding the replay). If the prize is awarded, a certain number of medals are credited or paid out according to the game state (i.e., BB is in progress or RB is in progress) and the prize (ST43).

[0165] The CPU 41 then checks whether or not BB or RB is in progress (ST44) and shifts to the process of ST45 if BB or RB is in progress. If BB or RB is not in progress, the CPU 41 shifts to the process of ST48. In the process of ST45, the number of games in BB/RB is checked, and the completion of BB is determined (ST46). If BB is completed, the CPU 41 clears stored data in RAM after transmission of a BB completion command (ST47), and shifts to the process of ST49. In ST46, if BB is not yet completed, the CPU 41 shifts to the process of ST49. Further, in ST44, if BB or RB is not in progress, a BB/RB winning check process is performed (ST48) and then the CPU 41 shifts to the process of ST49. In the process of ST49, the seven segment LED is controlled to indicate the numbers appropriately and then the CPU 41 returns to the process of ST15.

[0166] Hereinafter, the stopping control table selection process performed in ST28 will be described. As shown in Fig. 26, firstly, the CPU 41 determines whether the internally winning prize is the Bell prize" or not (ST50). If the internally winning prize is the "Bell prize", the CPU 41 shifts to the process of ST51. On the other hand, if the internally winning prize is not the "Bell prize", the CPU 41 shifts to the process of ST52.

[0167] In the process of ST51, a random number is selected and one of the table number is selected based the stopping control table number selection table. Further, in ST52, the stopping control table is selected according to the internally winning prize.

[0168] Hereinafter, with reference to Fig. 27 to 35, the processes regarding the sub controller 82 will be described.

[0169] Firstly, with reference to Fig. 27 and 28, an outline of the processes performed in the sub controller 82 will be described. The sub CPU 84 checks whether a medal insertion command receives, i.e., a medal for a game is inserted, or not (ST101). Here, the medal insertion command includes information indicating the number of inserted medals, etc. If the sub CPU 84 receives the medal insertion command, the sub CPU 84 shifts to the process of ST102. In the process of ST102, the number of inserted medals is updated while the operation of the start lever 6 is accepted. The sub CPU 84 then returns to the process of ST101.

[0170] The sub CPU 84 checks reception of the start command, i.e., whether or not a game is started, if the sub CPU 84 has not received the medal insertion command (ST103). If the sub CPU 84 has received the start command, the sub CPU 84 determines the number of bet medals (the game media) for the game (ST104) and updates the total number of bet medals (ST105). Further, the process to indicate the level on the ceiling indicator is performed (ST106). The sub CPU 84 checks and determines whether or not to implement the ceiling-AT (ST107). The sub CPU 84 then performs execution of the ceiling-AT if it was determined in ST107 (ST108), and returns to the process of ST101.

[0171] The sub CPU 84 checks reception of the winning command, i.e., whether or not a prescribed winning prize is awarded, if the sub CPU 84 has not received the start command in ST103 (ST109). If the sub CPU 84 has received the winning command, the sub CPU 84 updates the total number of paid medals (ST110). The sub CPU 84 then returns to the process of ST101.

[0172] The sub CPU 84 checks reception of the BB completion command, i.e., whether or not BB is completed in the current game, if the sub CPU 84 has not received the winning command in ST109 (ST111). If the sub CPU 84 has received the BB completion command, the sub CPU 84 clears the total number of bet medals and the total number of paid medals stored in the RAM, and then the level "1" is indicated on the ceiling indicator (ST112). Since the total number of bet medals and the total number of paid medals stored in the RAM are cleared, determination to implement the ceiling-AT can be performed starting from completion of BB.

[0173] Then, the start-value for the next implementation of the ceiling-AT is determined by a ceiling start-value selection process (ST113). The sub CPU 84 skips the processes of ST112 and ST113, and returns to the process of ST101 if the sub CPU 84 has not received the BB completion command in ST111.

[0174] Figs. 29A through 29D are diagrams explaining the "inserted medals update process" in ST102, the "bet medals determination process" in ST104, the "total bet medals update process" in ST105 and the "total paid medals update process" in ST110, respectively.

[0175] In the inserted medals update process shown in Fig. 29A, information regarding the number of inserted medals is stored in the RAM temporarily (ST114). In the bet medals determination process shown in Fig. 29B, the number of inserted medals is stored in the RAM at ST114 as the number of bet medals for an upcoming game (ST115). As described above, the number of inserted medals is observed in the inserted medals update process, and the number of bet medals is determined after then reception of the start command. Because the number of inserted medals can be changed using the 1-BET switch 11, the 2-BET switch 12 or the MAX-BET switch 13 until the start lever 6 is operated, it is necessary to determine the number of bet medals when the start lever 6 is operated.

[0176] In the total bet medals update process in Fig. 29C, the number of bet medals determined in ST115 for the upcoming game being stored in the RAM is added to the total number of bet medals (ST116). For example, if three medals are bet in the game, "3" is added to the total number of bet medals accordingly. The total number of bet medals can be counted by performing the process every game. In the total paid medals update process in Fig. 29D, the number of paid medals is added to the total number of paid medals if the medals are paid out (ST117). For example, "6" is added if the "Plum prize" is awarded, and "0" is added if no prizes are awarded. The total number of paid medals can be counted by performing the process every game.

[0177] Fig. 30 shows the ceiling indicator indication process of ST106. In the process, firstly, the number of medals in the respective levels of the ceiling being set, and the current difference between the number of consumed medals and the number of paid medals are compared based on the table for transition to the ceiling (ST118). Then, whether the level currently indicated is transferred or not is determined (ST119). The level is transferred to the next upper level and the level is indicated on the ceiling indicator as the result of the process in ST119 (ST120). On the other hand, if the level is not transferred as the result of ST119, the process is returned to ST118.

[0178] Fig. 31 shows the ceiling-AT start check process of ST 107. The ceiling-AT means that the "stopping operation assist-time (AT)", which is implemented to relieve the player. The ceiling-AT is implemented if the difference between the number of consumed medals and the number of paid medals reaches a prescribed value, and it is so-called "ceiling". Incidentally, the prescribed value is determined in the ceiling start-value selection process performed after completion of BB, and the value is 1200, 1500 or 1800.

[0179] In the process, it is firstly checked that the internally winning of BB occurs or it has occurred (ST121). If that is the case, the total number of bet medals and the total number of paid medals are cleared (ST122). The ceiling-AT is not therefore implemented until BB is completed once the internally winning of BB occurs.

[0180] If neither the internally winning of BB occurs nor it has occurred, it is checked whether or not the current difference reaches the value of the ceiling being set (ST123). Here, if the difference reaches the value of the ceiling, the table for the ceiling-AT quantity selection is set (ST124), and a random number is sampled (ST125). Then the sampled random number is added to the ceiling-AT quantity stock counter (ST126). In ST123, if the difference is smaller than the value of the ceiling, the process is returned to ST121.

[0181] Fig. 32 shows the ceiling start-value selection process of ST 113. The process is performed after BB is completed, and the number of medals for implementation of the next ceiling-AT is determined. In the process, a random number is sampled based on the table for ceiling

start-value selection so as to select the value of 1200, 1500 or 1800 (ST127). The selected value is stored in the RAM until the new value of the ceiling is selected after the completion of BB. As described above, since the different value of the ceiling is selected in the process, the value of the ceiling varies whereby the player is not able to easily recognize when the next ceiling-AT is implemented.

[0182] Fig. 33 shows the ceiling-AT execution process of ST108. In the process, it is checked that the value of the notifications counter is "1" or more (ST201). If the value is "1" or more, a pushing order notification process is performed to notify the player of the order of pushing the stop buttons (ST204). If the value is less than "1", it is checked that the value of the ceiling-AT quantity stock counter is "1" or more (ST202). If the value of the ceiling-AT quantity stock counter is "1" or more, a ceiling-AT implementation sampling process is performed to determine the number of ceiling to be implemented (ST203).

[0183] It means that the ceiling-AT is in progress if the value of the notification counter is "1" or more. Further, it means that the ceiling-AT which is being stocked, i.e., the ceiling-AT to be implemented, exists if the value of the ceiling-AT quantity stock counter is "1" or more.

[0184] Fig. 34 shows the pushing order notification process of ST204. Firstly, "1" is subtracted from the number stored in a pushing order notification counter (ST205). Then, it is checked whether the internally winning prize is the "Bell prize" or not (ST206). If the internally winning prize is the "Bell prize", information, which makes the player win the "Bell prize", is notified based on the selected stopping control table number (ST207), and the process then returns to ST205.

[0185] Fig. 35 shows the ceiling-AT implementation sampling process of ST203. Firstly, a random number is sampled based on the table for a ceiling-AT implementation sampling (ST208). As the result, it is checked whether the ceiling-AT is implemented or not (ST209). If the implementation of the ceiling-AT is determined, "10" is added to the pushing order notification counter (ST210) and "1" is subtracted from the ceiling-AT quantity stock counter (ST211). The process then returns to ST208.

[0186] In the processes described above, when information is displayed on the panel display unit 5, the information can be displayed very clearly in comparison with the conventional display unit by activating the LCD shutter 502 appropriately so as to conceal the position of the spinning reels 3L, 3C, 3R.

[0187] The invention has been described in detail by referring to the embodiments. It is obvious to those skilled in art that the invention is not restricted to the embodiments mentioned above. In the embodiment, although, the total number of paid medals and the total number of bet medals are cleared when the internally winning of BB occurs, BB is in progress or BB is awarded, the timing to clear those numbers can be arbitrarily set and it is also possible that those numbers are not cleared.

[0188] Further, although the stopping operation assist-time (AT) is always implemented when the difference between consumed medals and paid medals reaches a prescribed value in the embodiment, a prescribe number of such relieving may be adopted (only once, for example) for the gaming apparatus 1.

[0189] Moreover, in the embodiment, the order of the operation of the stop buttons, which is required to win the prize, is notified in the AT, but an AT that notifies the internally winning prize can also be adopted. Further, in order to provide an advantageous situation for the player, BB or RB may also be adopted besides the AT, in which the player may earn plenty of the game token.

[0190] The present invention can be applied to the other gaming apparatus besides the pachi-slo gaming apparatus of the embodiment, e.g., a pachinko gaming apparatus and a slot machine for casinos. Normally, such slot machines are configured without a stop button and are featured so that the reels start spinning by activation of a start lever or a start button and stop automatically after a prescribed time elapsed. Further, in lieu of payout in coin or medal, it is possible that the slot machine is featured to store information regarding the equivalent value of a game into a ticket or a card.

[0191] As described heretofore, according to the present invention, since the concealing unit to temporarily conceal the display of the variable display unit from the side of front display unit is set, objects can be displayed using either the front display unit or the variable display unit on a case-by-case basis so that the recognition of the objects by the player is increased drastically. In other words, if a certain position is concealed by activation of the concealing unit, the symbols of the variable display unit are not viewed and thus only the objects displayed on the front display unit can be viewed. On the other hand, when the concealing unit is not activated, the symbols of the variable display unit are viewed, and for example, the symbols of the variable display unit can be clearly displayed if no objects are displayed on the front display unit.

Claims

1. A gaming apparatus comprising:

   a variable display unit (3L, 3C, 3R) configured to variably display a plurality of symbols;
   a front side display unit (501) located in front of the variable display unit (3L, 3C, 3R) and configured to enable viewing of the symbols displayed by the variable display unit (3L, 3C, 3R);
   an internally winning prize determiner configured to determine an internally winning prize;
   a stopping controller configured to stop the varying of display of the variable display unit (3L, 3C, 3R) based on a result of determination by the internally winning prize determiner; and
   wherein,

a prize is awarded if a stopped state displayed on the variable display unit (3L, 3C, 3R), which is caused by the stopping controller, matches a prescribed stopped state,
the gaming apparatus further comprises a concealing unit located between the variable display unit (3L, 3C, 3R) and the front side display unit (501) and configured to temporarily conceal the display of the variable display unit (3L, 3C, 3R), wherein the concealing unit comprises an electronic shutter **characterized in that** the electronic shutter is adapted to conceal an arbitrary position.

2. A gaming apparatus according to claim 1, wherein the shutter (502, 502') comprises a panel configured by a liquid crystal display or a transparent electronic luminescent display.

3. A gaming apparatus according to claim 1 or 2, further comprising a plurality of stoppers (7L, 7C, 7R) configured to stop the varying of display of the variable display unit (3L, 3C, 3R).

Patentansprüche

1. Spielvorrichtung, die umfasst:

eine variable Anzeigeeinheit (3L, 3C, 3R), die so konfiguriert ist, dass sie eine Vielzahl von Symbolen variabel anzeigt;
eine Vorderseite-Anzeigeeinheit (501), die vor der variablen Anzeigeeinheit (3L, 3C, 3R) angeordnet und so konfiguriert ist, dass sie Betrachtung der von der variablen Anzeigeeinheit (3L, 3C, 3R) angezeigten Symbole ermöglicht;
eine Einrichtung zum Bestimmen eines Preises eines internen Gewinns, die so konfiguriert ist, dass sie einen Preis eines internen Gewinns bestimmt;
eine Anhalte-Steuereinheit, die so konfiguriert ist, dass sie die Änderung der Anzeige der variablen Anzeigeeinheit (3L, 3C, 3R) auf Basis der Bestimmung durch die Einrichtung zum Bestimmen eines Preises eines internen Gewinns anhält; und wobei
ein Preis vergeben wird, wenn ein angehaltener Zustand, der auf der variablen Anzeigeeinheit (3L, 3C, 3R) angezeigt wird und durch die Anhalte-Steuereinheit verursacht wird, einem vorgeschriebenen angehaltenen Zustand entspricht,

wobei die Spielvorrichtung des Weiteren eine Abdeckeinheit umfasst, die sich zwischen der variablen Anzeigeeinheit (3L, 3C, 3R) und der Vorderseiten-Anzeigeeinheit (501) befindet und so konfiguriert ist, dass sie die Anzeige der variablen Anzeigeeinheit (3L, 3C, 3R) vorübergehend abdeckt, wobei die Abdeckeinheit einen elektronischen Verschluss umfasst, **dadurch gekennzeichnet, dass** der elektronische Verschluss so eingerichtet ist, dass er eine beliebige Position abdeckt.

2. Spielvorrichtung nach Anspruch 1, wobei der Verschluss (502, 502') eine Scheibe umfasst, die von einer Flüssigkristallanzeige oder einer transparenten elektronischen Lumineszenzanzeige gebildet wird.

3. Spielvorrichtung nach Anspruch 1 oder 2, die des Weiteren eine Vielzahl von Anhalteeinrichtungen (7L, 7C, 7R) umfasst, die so konfiguriert sind, dass sie die Änderung der Anzeige der variablen Anzeigeeinheit (3L, 3C, 3R) anhalten.

Revendications

1. Machine de jeu comportant:

une unité d'affichage variable (3L, 3C, 3R) configurée pour afficher de façon variable une pluralité de symboles ;
une unité d'affichage frontale (501) située devant l'unité d'affichage variable (3L, 3C, 3R) et configurée pour permettre la visualisation de symboles affichés par l'unité d'affichage variable (3L, 3C, 3R) ;
un dispositif déterminant le prix gagnant configuré pour déterminer un prix gagnant ;
un contrôleur d'arrêt configuré pour arrêter le déroulement de l'affichage de l'unité d'affichage variable (3L, 3C, 3R) en fonction d'un résultat de détermination par le dispositif déterminant le prix gagnant ; et dans lequel,
un prix est attribué si un état arrêté affiché sur l'unité d'affichage variable (3L, 3C, 3R), qui est provoqué par le contrôleur d'arrêt, correspond à un état arrêté prescrit,
la machine de jeu comporte en outre une unité de masquage située entre l'unité d'affichage variable (3L, 3C, 3R) et l'unité d'affichage frontale (501) et configurée pour masquer temporairement l'affichage de l'unité d'affichage variable (3L, 3C, 3R), dans lequel l'unité de masquage comprend un obturateur électronique **caractérisé en ce que** l'obturateur électronique est adapté pour masquer une position arbitraire.

2. Machine de jeu selon la revendication 1, dans laquelle l'obturateur (502, 502') comporte un panneau configuré par un affichage à cristaux liquides ou un affichage luminescent électronique transparent.

3. Machine de jeu selon la revendication 1 ou 2, comportant en outre une pluralité de dispositifs d'arrêt (7L, 7C, 7R) configurés pour arrêter le déroulement de l'affichage de l'unité d'affichage variable (3L, 3C, 3R).

FIG.1

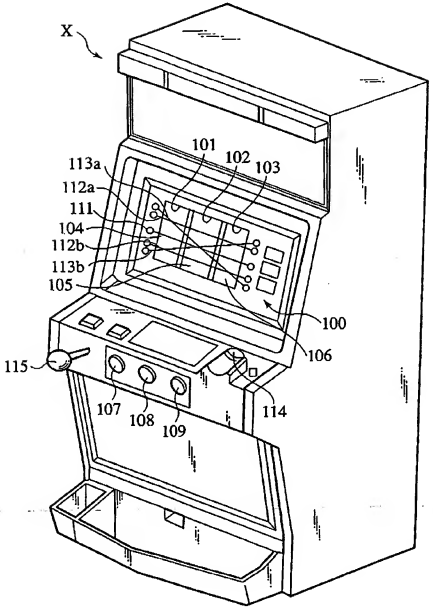

X
101
102
103
113a
112a
111
104
112b
113b
105
100
106
115
107
108
109
114

FIG.2

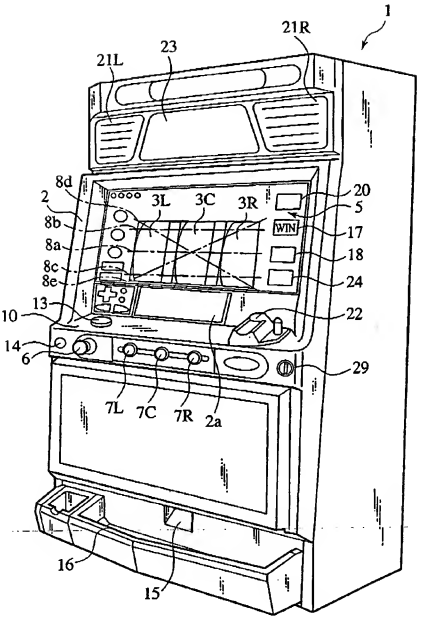

1
21R
23
21L
8d
2
3L
3C
3R
20
5
8b
WIN
17
8a
18
8c
8e
24
13
22
10
14
6
29
7L
7C
7R
2a
16
15

FIG.3

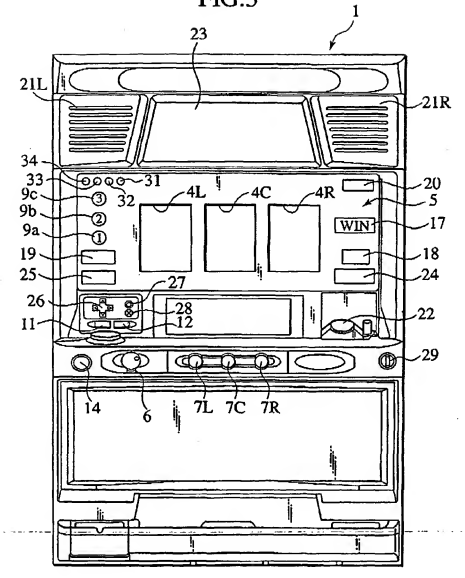

1
23
21L
21R
34
33
31
9c
32
4L
4C
4R
20
5
9b
9a
WIN
17
19
18
25
24
27
26
28
22
11
12
29
14
6
7L
7C
7R

FIG.4

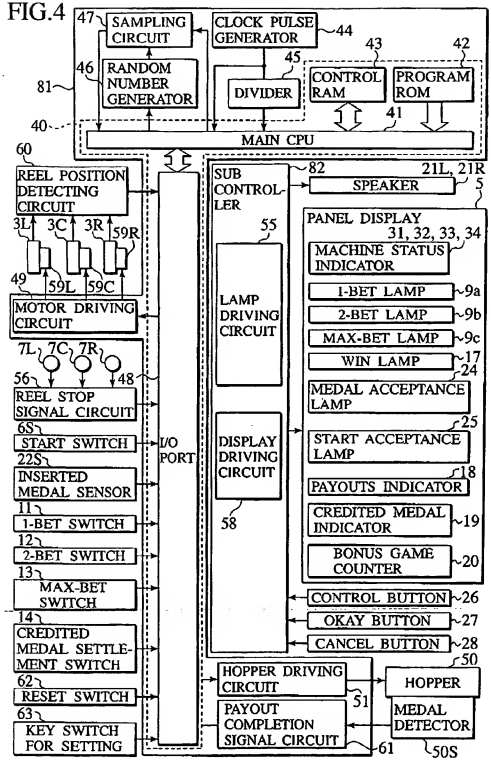

47
SAMPLING CIRCUIT
CLOCK PULSE GENERATOR
44
43
42
46
RANDOM NUMBER GENERATOR
45
CONTROL RAM
PROGRAM ROM
81
DIVIDER
41
40
MAIN CPU
60
REEL POSITION DETECTING CIRCUIT
3L
3C
3R
59R
49
59L
59C
MOTOR DRIVING CIRCUIT
7L
7C
7R
56
48
REEL STOP SIGNAL CIRCUIT
6S
START SWITCH
22S
INSERTED MEDAL SENSOR
11
1-BET SWITCH
12
2-BET SWITCH
13
MAX-BET SWITCH
14
CREDITED MEDAL SETTLE-MENT SWITCH
62
RESET SWITCH
63
KEY SWITCH FOR SETTING
I/O PORT
SUB CONTROL-LER
82
SPEAKER
21L, 21R
5
55
LAMP DRIVING CIRCUIT
DISPLAY DRIVING CIRCUIT
58
PANEL DISPLAY
31, 32, 33, 34
MACHINE STATUS INDICATOR
1-BET LAMP
9a
2-BET LAMP
9b
MAX-BET LAMP
9c
WIN LAMP
17
24
MEDAL ACCEPTANCE LAMP
25
START ACCEPTANCE LAMP
18
PAYOUTS INDICATOR
CREDITED MEDAL INDICATOR
19
BONUS GAME COUNTER
20
CONTROL BUTTON
26
OKAY BUTTON
27
CANCEL BUTTON
28
50
HOPPER DRIVING CIRCUIT
HOPPER
51
PAYOUT COMPLETION SIGNAL CIRCUIT
MEDAL DETECTOR
61
50S

FIG.5

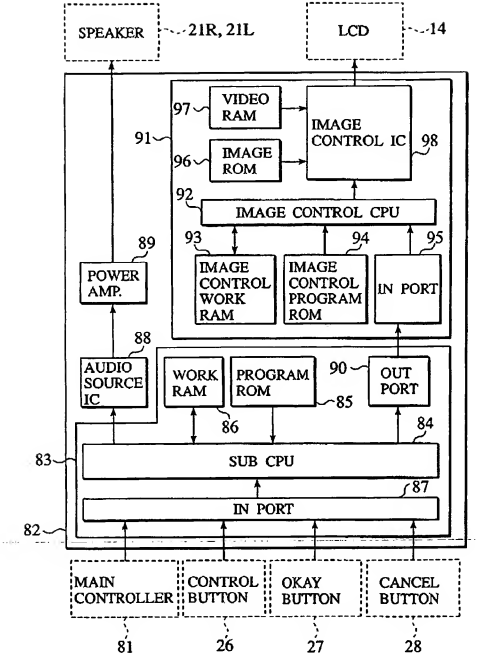

SPEAKER
21R, 21L
LCD
14
VIDEO RAM
97
IMAGE CONTROL IC
98
91
IMAGE ROM
96
92
IMAGE CONTROL CPU
89
93
94
95
POWER AMP.
IMAGE CONTROL WORK RAM
IMAGE CONTROL PROGRAM ROM
IN PORT
88
AUDIO SOURCE IC
WORK RAM
PROGRAM ROM
90
OUT PORT
86
85
84
83
SUB CPU
87
IN PORT
82
MAIN CONTROLLER
CONTROL BUTTON
OKAY BUTTON
CANCEL BUTTON
81
26
27
28

FIG.6


LEFT REEL
CENTER REEL
RIGHT REEL
00 RED 7
01 CHERRY
02 BLUE 7
03 BELL
04 REPLAY
05 RED 7
06 CHERRY
07 BLUE 7
08 BELL
09 REPLAY
10 PLUM
11 BELL
12 REPLAY
13 BAR
14 RED 7
15 BELL
16 PLUM
17 REPLAY
18 PLUM
19 BELL
20 REPLAY
00 RED 7
01 PLUM
02 REPLAY
03 BELL
04 CHERRY
05 REPLAY
06 CHERRY
07 BELL
08 BAR
09 CHERRY
10 REPLAY
11 BELL
12 BLUE 7
13 REPLAY
14 CHERRY
15 BELL
16 BAR
17 PLUM
18 REPLAY
19 BELL
20 CHERRY
00 RED 7
01 BELL
02 REPLAY
03 BAR
04 PLUM
05 BELL
06 REPLAY
07 CHERRY
08 BLUE 7
09 CHERRY
10 BELL
11 REPLAY
12 CHERRY
13 PLUM
14 BELL
15 REPLAY
16 CHERRY
17 BLUE 7
18 BELL
19 REPLAY
20 CHERRY

FIG.7

PRIZES TO BE AWARDED AND THE NUMBER OF MEDALS TO BE PAID OUT CORRESPONDING TO WINNING SYMBOL COMBINATIONS

SYMBOL COMBINATION	NORMAL GAME STATE	NORMAL GAME STATE IN BB STATE	RB GAME STATE
RED 7-RED 7-RED 7	BB 15 pc.	–	–
BLUE 7-BLUE 7-BLUE 7	BB 15 pc.	–	–
BAR-BAR-BAR	RB 15 pc.	–	–
BELL-BELL-BELL	BELL PRIZE 15 pc.	BELL PRIZE 15 pc.	–
PLUM-PLUM-PLUM	PLUM PRIZE 6 pc.	PLUM PRIZE 6 pc.	–
REPLAY-REPLAY-REPLAY	REPLAY 0 pc.	RB (JAC IN) 15 pc.	15 pc.
CHERRY-ANY-ANY	CHERRY PRIZE 2 OR 4 pc.	CHERRY PRIZE 2 OR 4 pc.	–

FIG.8

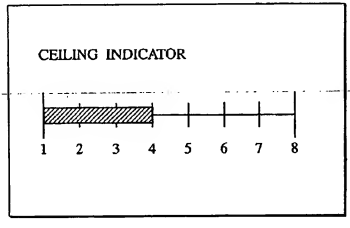
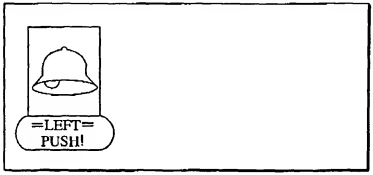
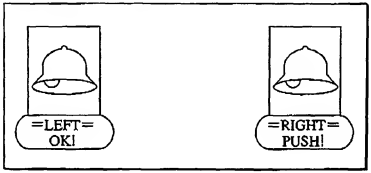


FIG.9

(1) PICTURE NOTIFYING TO PUSH LEFT STOP BUTTON



(2) PICTURE NOTIFYING TO PUSH RIGHT STOP BUTTON



(3) PICTURE NOTIFYING TO PUSH CENTER STOP BUTTON

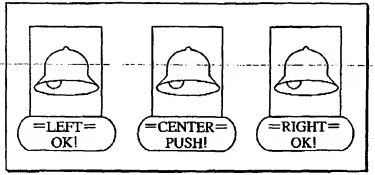


FIG.10A

PROBABILITY SAMPLING TABLE USED UNDER NORMAL GAME STATE (RANDOM NUMBER RANGE : 0～16383)

PRIZES	RANDOM NUMBER RANGE TO BE AWARDED No. OF BET = 3	INTERNALLY WINNING PROBABILITY
BB	0～54	55/16384
RB	55～82	28/16384
REPLAY	83～2327	2245/16384
BELL PRIZE	2328～10919	8592/16384
PLUM PRIZE	10920～10973	54/16384
CHERRY PRIZE	10974～11036	63/16384

FIG.10B

PROBABILITY SAMPLING TABLE USED UNDER NORMAL GAME STATE IN BB STATE (RANDOM NUMBER RANGE : 0～16383)

PRIZES	RANDOM NUMBER RANGE TO BE AWARDED No. OF BET = 3	INTERNALLY WINNING PROBABILITY
BB	－ ～ －	0/16384
RB	－ ～ －	0/16384
REPLAY (RB IN BB)	0～4199	4200/16384
BELL PRIZE	4200～14499	10300/16384
PLUM PRIZE	14500～16319	1820/16384
CHERRY PRIZE	－ ～ －	0/16384

FIG.11

STOPPING CONTROL TABLE NUMBER SELECTION TABLE

(RANDOM NUMBER RANGE : 0～255)

TABLE No.	RANDOM NUMBER RANGE TO BE AWARDED No. BET = 3	SELECTION PROBABILITY
No.1	0～42	43/256
No.2	43～85	43/256
No.3	86～128	43/256
No.4	129～171	43/256
No.5	172～213	42/256
No.6	214～255	42/256

FIG.12

RELATIONSHIP BETWEEN ORDER OF OPERATION AND WINNING OF BELL PRIZE

		TABLE No.					
		1	2	3	4	5	6
ORDER OF REEL STOPS	L-C-R	W	L	L	L	L	L
	L-R-C	L	W	L	L	L	L
	C-L-R	L	L	W	L	L	L
	C-R-L	L	L	L	W	L	L
	R-L-C	L	L	L	L	W	L
	R-C-L	L	L	L	L	L	W

W : WIN (TO BE AWARDED)
L : LOSE (NOT TO BE AWARDED)

FIG.13

STOPPING CONTROL TABLE (PRIZE TO BE AWARDED)
[INTERNALLY WINNING PRIZE : BELL PRIZE]

LEFT REEL		CENTER REEL		RIGHT REEL	
POSITION WHEN STOP BUTTON IS PUSHED	CONTROLLED STOP POSITION	POSITION WHEN STOP BUTTON IS PUSHED	CONTROLLED STOP POSITION	POSITION WHEN STOP BUTTON IS PUSHED	CONTROLLED STOP POSITION
00	19	00	19	00	18
01	19	01	19	01	01
02	19	02	19	02	01
03	03	03	03	03	01
04	03	04	03	04	01
05	03	05	03	05	05
06	03	06	03	06	05
07	03	07	07	07	05
08	08	08	07	08	05
09	08	09	07	09	05
10	08	10	07	10	10
11	11	11	11	11	10
12	11	12	11	12	10
13	11	13	11	13	10
14	11	14	11	14	14
15	15	15	15	15	14
16	15	16	15	16	14
17	15	17	15	17	14
18	15	18	15	18	18
19	19	19	19	19	18
20	19	20	19	20	18

EP 1 376 495 B1

FIG.14 STOPPING CONTROL TABLE (PRIZE MISSED / FOR REGULAR-ORDER PUSHING AND CENTER-START PUSHING) [INTERNALLY WINNING PRIZE: BELL PRIZE]

LEFT REEL		CENTER REEL		RIGHT REEL	
POSITION WHEN STOP BUTTON IS PUSHED	CONTROLLED STOP POSITION	POSITION WHEN STOP BUTTON IS PUSHED	CONTROLLED STOP POSITION	POSITION WHEN STOP BUTTON IS PUSHED	CONTROLLED STOP POSITION
00	19	00	19	00	19
01	19	01	19	01	19
02	19	02	19	02	02
03	03	03	03	03	02
04	03	04	03	04	02
05	03	05	03	05	02
06	03	06	03	06	06
07	03	07	07	07	06
08	08	08	07	08	06
09	08	09	07	09	06
10	08	10	07	10	06
11	11	11	11	11	11
12	11	12	11	12	11
13	11	13	11	13	11
14	11	14	11	14	11
15	15	15	15	15	15
16	15	16	15	16	15
17	15	17	15	17	15
18	15	18	15	18	15
19	19	19	19	19	19
20	19	20	19	20	19

EP 1 376 495 B1

FIG.15 STOPPING CONTROL TABLE (PRIZE MISSED / FOR REVERSE-ORDER PUSHING) [INTERNALLY WINNING PRIZE : BELL PRIZE]

LEFT REEL		CENTER REEL		RIGHT REEL	
POSITION WHEN STOP BUTTON IS PUSHED	CONTROLLED STOP POSITION	POSITION WHEN STOP BUTTON IS PUSHED	CONTROLLED STOP POSITION	POSITION WHEN STOP BUTTON IS PUSHED	CONTROLLED STOP POSITION
00	20	00	19	00	18
01	20	01	19	01	01
02	20	02	19	02	01
03	20	03	03	03	01
04	04	04	03	04	01
05	04	05	03	05	05
06	04	06	03	06	05
07	04	07	07	07	05
08	04	08	07	08	05
09	09	09	07	09	05
10	09	10	07	10	10
11	09	11	11	11	10
12	12	12	11	12	10
13	12	13	11	13	10
14	12	14	11	14	14
15	12	15	15	15	14
16	12	16	15	16	14
17	17	17	15	17	14
18	17	18	15	18	18
19	17	19	19	19	18
20	20	20	19	20	18

EP 1 376 495 B1

FIG.16A

TABLE FOR CEILING-AT QUANTITY SELECTION

QTY.	VALUE
1	2356
2	1512
5	196
10	28
30	4

FIG.16B

TABLE FOR CEILING-AT IMPLEMENTATION SAMPLING

	VALUE
IMPLEMENT	32
STOCK	224

FIG.17A

TABLE FOR CEILING START-VALUE SELECTION

PIECES	SAMPLED VALUE
1200	64
1500	128
1800	64

FIG.17B

TABLE FOR TRANSITION TO CEILING

		1200 pc.	1500 pc.	1800 pc.
LEVEL OF CEILING	LEVEL 1	150	188	225
	LEVEL 2	300	375	450
	LEVEL 3	450	563	675
	LEVEL 4	600	750	900
	LEVEL 5	750	938	1125
	LEVEL 6	900	1125	1350
	LEVEL 7	1050	1313	1575
	LEVEL 8	1200	1500	1800

FIG.18

START COMMANDS

1	INTERNALLY WINNING PRIZE
2	BB
	RB
	REPLAY
	BELL
	PLUM
	CHERRY
	MISSED
	–
3	GAME STATE
4	NORMAL GAME STATE
	BB INTERNALLY AWARDED
	RB INTERNALLY AWARDED
	BB IN PROGRESS
	RB IN PROGRESS
	–
	–
	–
5	STOPPING CONTROL TABLE
6	TABLE No. 1
	TABLE No. 2
	TABLE No. 3
	TABLE No. 4
	TABLE No. 5
	TABLE No. 6
	–
	–

BB COMPLETION COMMANDS

1	STATE AT BB COMPLETION
2	GAME RE-STARTABLE
	SETTLEMENT
	FORCED GAME-OVER
	–
	–
	–
	–
	–

FIG.19

	WINNING COMMANDS
1	PRIZE
2	BB
	RB
	REPLAY
	BELL
	PLUM
	CHERRY
	MISSED
	–
3	GAME STATE
4	NORMAL GAME STATE
	BB INTERNALLY AWARDED
	RB INTERNALLY AWARDED
	BB IN PROGRESS
	RB IN PROGRESS
	–
	–
	–
5	WINNING LINE
6	CENTER
	UPPER
	LOWER
	UPWARD SLANT TO RIGHT
	DOWNWARD SLANT TO RIGHT
	–
	–
	–

	MEDAL INSERTION COMMANDS
1	No. OF INSERTED MEDALS
2	1 pc.
	2 pc.
	3 pc.
	–
	–
	–
	–
	–

FIG.20

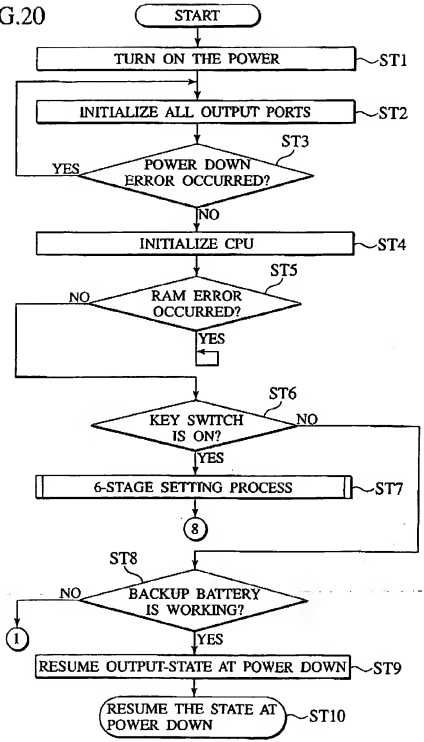

START
TURN ON THE POWER
ST1
INITIALIZE ALL OUTPUT PORTS
ST2
ST3
YES
POWER DOWN ERROR OCCURRED?
NO
INITIALIZE CPU
ST4
ST5
NO
RAM ERROR OCCURRED?
YES
ST6
KEY SWITCH IS ON?
NO
YES
6-STAGE SETTING PROCESS
ST7
8
ST8
NO
BACKUP BATTERY IS WORKING?
1
YES
RESUME OUTPUT-STATE AT POWER DOWN
ST9
RESUME THE STATE AT POWER DOWN
ST10

FIG.21

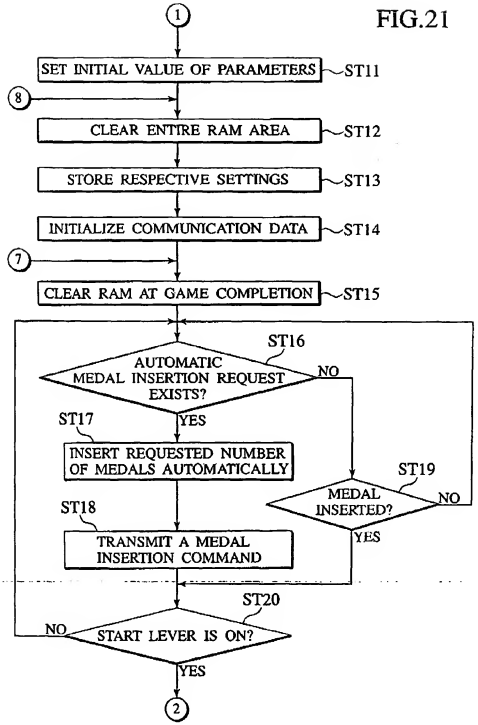

1
SET INITIAL VALUE OF PARAMETERS
ST11
8
CLEAR ENTIRE RAM AREA
ST12
STORE RESPECTIVE SETTINGS
ST13
INITIALIZE COMMUNICATION DATA
ST14
7
CLEAR RAM AT GAME COMPLETION
ST15
ST16
AUTOMATIC MEDAL INSERTION REQUEST EXISTS?
NO
YES
ST17
INSERT REQUESTED NUMBER OF MEDALS AUTOMATICALLY
ST19
MEDAL INSERTED?
NO
YES
ST18
TRANSMIT A MEDAL INSERTION COMMAND
ST20
NO
START LEVER IS ON?
YES
2

FIG.22

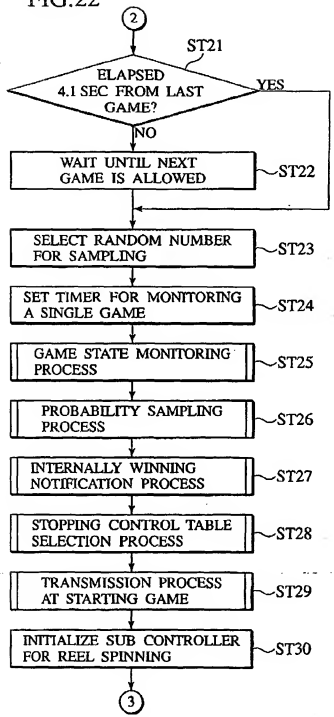

2
ST21
ELAPSED 4.1 SEC FROM LAST GAME?
YES
NO
WAIT UNTIL NEXT GAME IS ALLOWED
ST22
SELECT RANDOM NUMBER FOR SAMPLING
ST23
SET TIMER FOR MONITORING A SINGLE GAME
ST24
GAME STATE MONITORING PROCESS
ST25
PROBABILITY SAMPLING PROCESS
ST26
INTERNALLY WINNING NOTIFICATION PROCESS
ST27
STOPPING CONTROL TABLE SELECTION PROCESS
ST28
TRANSMISSION PROCESS AT STARTING GAME
ST29
INITIALIZE SUB CONTROLLER FOR REEL SPINNING
ST30
3

FIG.23

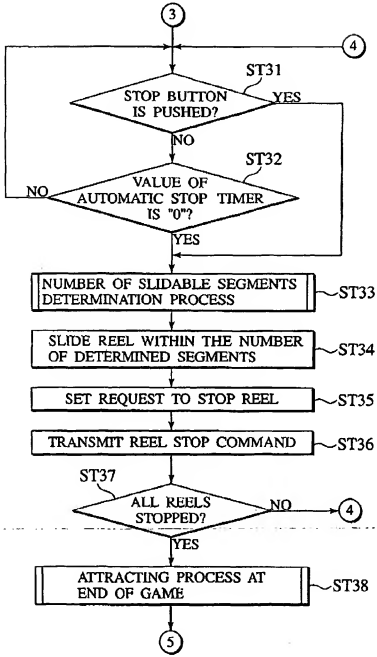

3
4
ST31
STOP BUTTON IS PUSHED?
YES
NO
ST32
NO
VALUE OF AUTOMATIC STOP TIMER IS "0"?
YES
NUMBER OF SLIDABLE SEGMENTS DETERMINATION PROCESS
ST33
SLIDE REEL WITHIN THE NUMBER OF DETERMINED SEGMENTS
ST34
SET REQUEST TO STOP REEL
ST35
TRANSMIT REEL STOP COMMAND
ST36
ST37
ALL REELS STOPPED?
NO
4
YES
ATTRACTING PROCESS AT END OF GAME
ST38
5

FIG.24

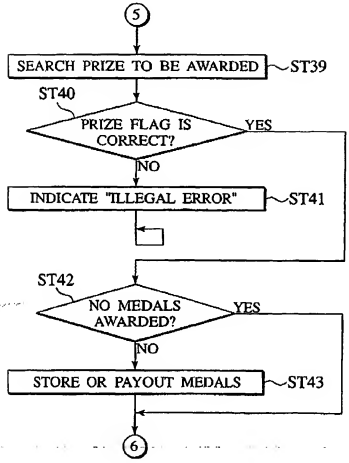

5
SEARCH PRIZE TO BE AWARDED
ST39
ST40
PRIZE FLAG IS CORRECT?
YES
NO
INDICATE "ILLEGAL ERROR"
ST41
ST42
NO MEDALS AWARDED?
YES
NO
STORE OR PAYOUT MEDALS
ST43
6

FIG.25

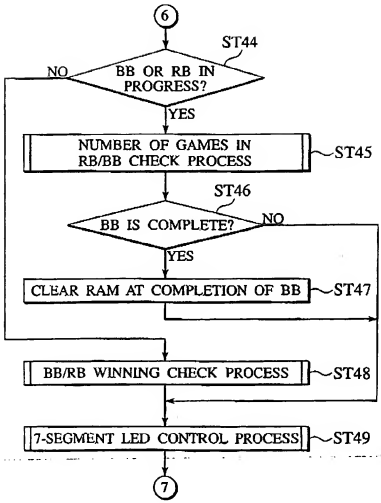

6
ST44
NO
BB OR RB IN PROGRESS?
YES
NUMBER OF GAMES IN RB/BB CHECK PROCESS
ST45
ST46
BB IS COMPLETE?
NO
YES
CLEAR RAM AT COMPLETION OF BB
ST47
BB/RB WINNING CHECK PROCESS
ST48
7-SEGMENT LED CONTROL PROCESS
ST49
7

FIG.26

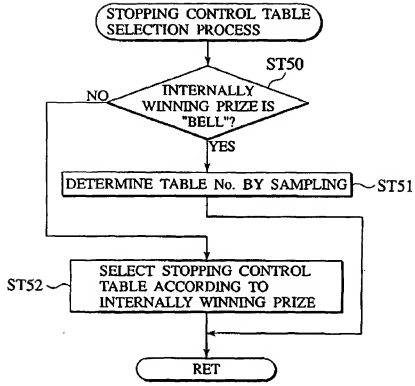

STOPPING CONTROL TABLE SELECTION PROCESS
ST50
INTERNALLY WINNING PRIZE IS "BELL"?
NO
YES
DETERMINE TABLE No. BY SAMPLING
ST51
SELECT STOPPING CONTROL TABLE ACCORDING TO INTERNALLY WINNING PRIZE
ST52
RET

FIG.27

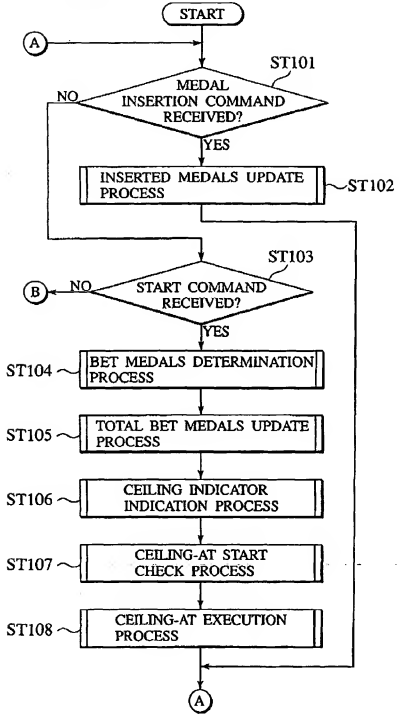

START
A
ST101
MEDAL INSERTION COMMAND RECEIVED?
NO
YES
INSERTED MEDALS UPDATE PROCESS
ST102
ST103
B
NO
START COMMAND RECEIVED?
YES
ST104
BET MEDALS DETERMINATION PROCESS
ST105
TOTAL BET MEDALS UPDATE PROCESS
ST106
CEILING INDICATOR INDICATION PROCESS
ST107
CEILING-AT START CHECK PROCESS
ST108
CEILING-AT EXECUTION PROCESS
A

FIG.28

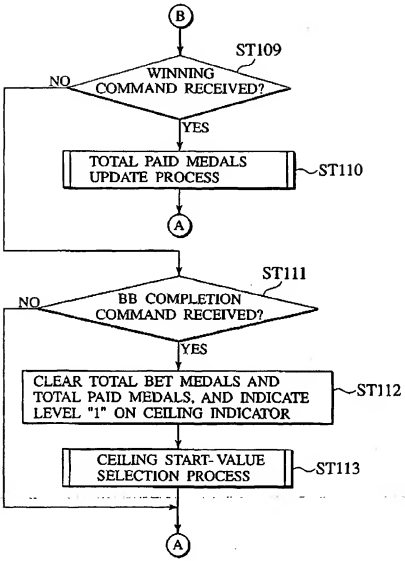

B
ST109
WINNING COMMAND RECEIVED?
NO
YES
TOTAL PAID MEDALS UPDATE PROCESS
ST110
A
ST111
BB COMPLETION COMMAND RECEIVED?
NO
YES
CLEAR TOTAL BET MEDALS AND TOTAL PAID MEDALS, AND INDICATE LEVEL "1" ON CEILING INDICATOR
ST112
CEILING START-VALUE SELECTION PROCESS
ST113
A

FIG.29A

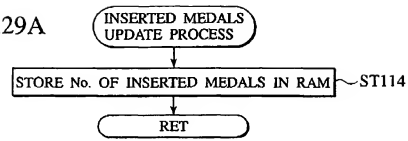


FIG.29B

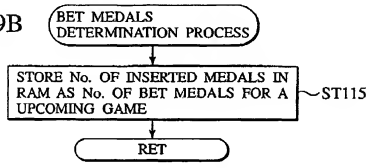


FIG.29C

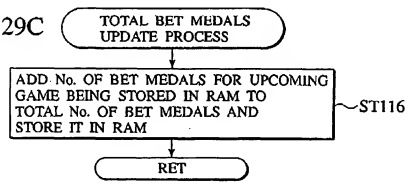


FIG.29D

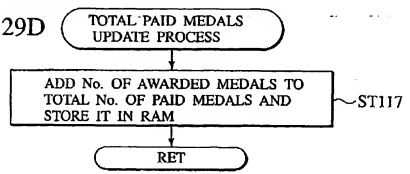


FIG.30

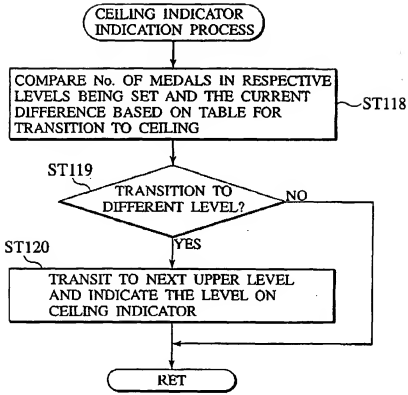

CEILING INDICATOR INDICATION PROCESS
COMPARE No. OF MEDALS IN RESPECTIVE LEVELS BEING SET AND THE CURRENT DIFFERENCE BASED ON TABLE FOR TRANSITION TO CEILING
ST118
ST119
TRANSITION TO DIFFERENT LEVEL?
NO
YES
ST120
TRANSIT TO NEXT UPPER LEVEL AND INDICATE THE LEVEL ON CEILING INDICATOR
RET

FIG.31

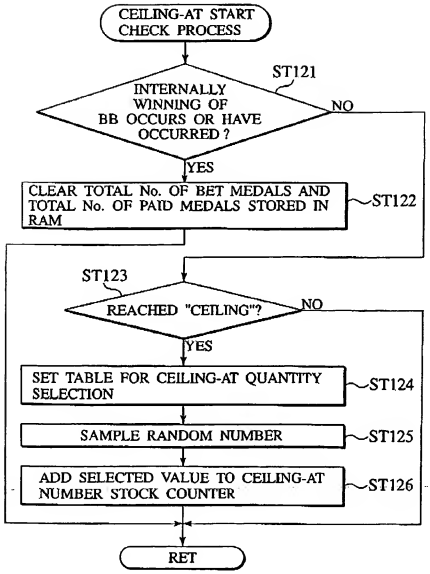

CEILING-AT START CHECK PROCESS
ST121
INTERNALLY WINNING OF BB OCCURS OR HAVE OCCURRED ?
NO
YES
CLEAR TOTAL No. OF BET MEDALS AND TOTAL No. OF PAID MEDALS STORED IN RAM
ST122
ST123
REACHED "CEILING"?
NO
YES
SET TABLE FOR CEILING-AT QUANTITY SELECTION
ST124
SAMPLE RANDOM NUMBER
ST125
ADD SELECTED VALUE TO CEILING-AT NUMBER STOCK COUNTER
ST126
RET

FIG.32

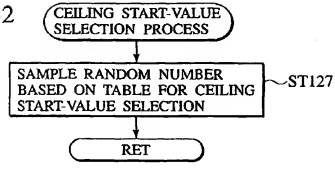

CEILING START-VALUE SELECTION PROCESS
SAMPLE RANDOM NUMBER BASED ON TABLE FOR CEILING START-VALUE SELECTION
ST127
RET

FIG.33

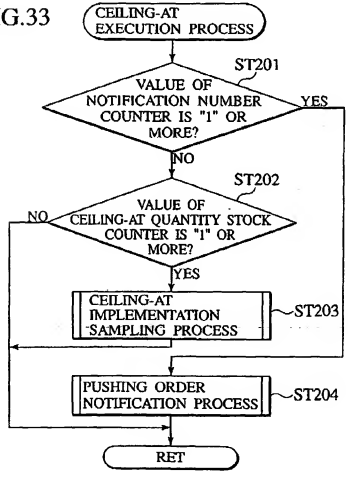

CEILING-AT EXECUTION PROCESS
ST201
VALUE OF NOTIFICATION NUMBER COUNTER IS "1" OR MORE?
YES
NO
ST202
VALUE OF CEILING-AT QUANTITY STOCK COUNTER IS "1" OR MORE?
NO
YES
CEILING-AT IMPLEMENTATION SAMPLING PROCESS
ST203
PUSHING ORDER NOTIFICATION PROCESS
ST204
RET

FIG.34

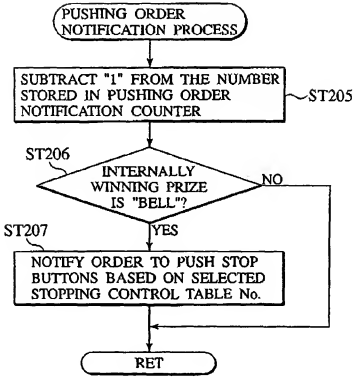

PUSHING ORDER NOTIFICATION PROCESS
SUBTRACT "1" FROM THE NUMBER STORED IN PUSHING ORDER NOTIFICATION COUNTER
ST205
ST206
INTERNALLY WINNING PRIZE IS "BELL"?
NO
YES
ST207
NOTIFY ORDER TO PUSH STOP BUTTONS BASED ON SELECTED STOPPING CONTROL TABLE No.
RET

FIG.35

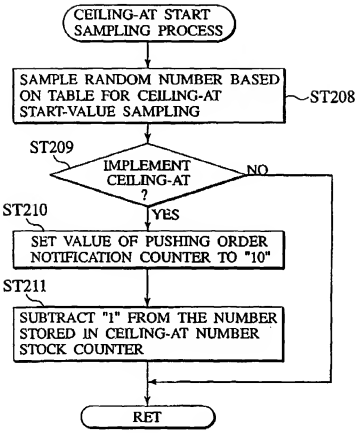

CEILING-AT START SAMPLING PROCESS
SAMPLE RANDOM NUMBER BASED ON TABLE FOR CEILING-AT START-VALUE SAMPLING
ST208
ST209
IMPLEMENT CEILING-AT ?
NO
YES
ST210
SET VALUE OF PUSHING ORDER NOTIFICATION COUNTER TO "10"
ST211
SUBTRACT "1" FROM THE NUMBER STORED IN CEILING-AT NUMBER STOCK COUNTER
RET

FIG.36

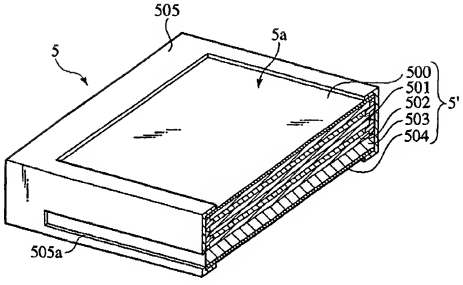


FIG.37

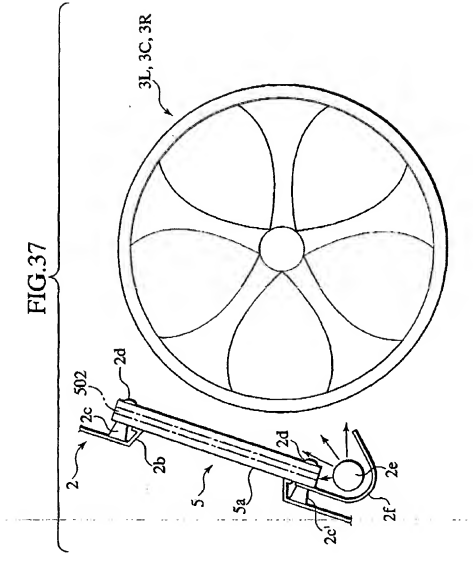


FIG.38

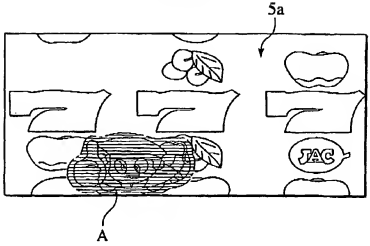


FIG.39

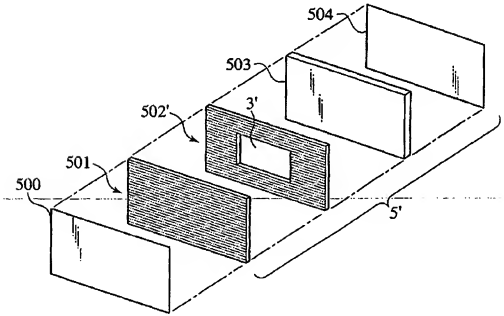


FIG.40

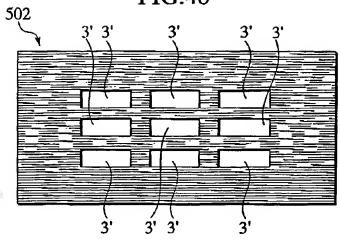


FIG.41

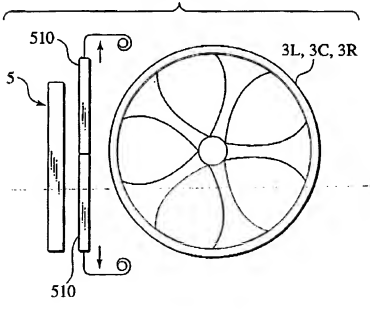


FIG.42A

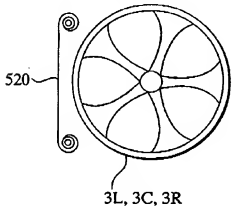


FIG.42B